GSE Intégration

GSE INTEGRATION INSTALLATION MANUAL

Photovoltaic mounting system for partial or complete roof covering

PASS'INNOVATION VERT CSTB N°2013-221 OCTOBRE 2013 - OCTOBRE 2015

ALPES CONTROLES ETN N°BT130003 MARS 2014 MARS 2017

MCS BBA CERTIFICATE BBA 0156

V 10.2

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Presentation of system

GSE INTEGRATION IN ROOF SYSTEM

The GSE Integration system is used to install modules on all types of roofing, (curved tiles, mechanical, flat, slates), on new buildings or buildings being renovated.

The system may be installed in portrait format or in landscape format, with a specific mounting plate for each format, on both small installations (less than 3 kWp) and large roofs (several hundred kWp).

The GSE Integration system may be installed on wood or metal structures and mounted on battens or lathing. It can also be mounted directly on common rafters and can be installed on slopes between 15° and 50°.

The GSE Integration system is guaranteed for 10 years, provided the installation recommendations given below are respected. The system does not require much maintenance, except for regular cleaning of the solar panels.

GSE Intégration

Contents of kit

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ASSEMBLY ACCESSORIES

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FLASHINGS

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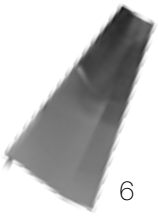
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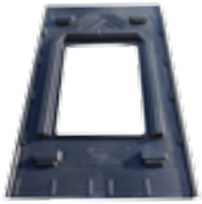
MOUNTING PLATES

11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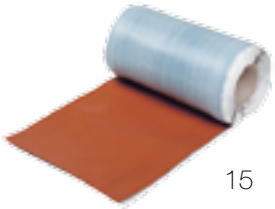
WATERPROOFING


15

16

17

ASSEMBLY ACCESSORIES

1. Stainless Steel Screw 6.5 x 60mm + EPDM Washer
2. Cellular EPDM Joint 21x25mm or 23x45mm
3. 2014 Single and double renforceer clamps

FLASHINGS

4. Flashing Hooks
5. Left and Right Top Flashings + Screw 4.8x25mm
6. Top Center Flashing
7. Aluminum Pop Rivet
8. Top Corner Piece (For top Center Flashing)
9. Lateral Flashing + Screw 4.8x25mm
10. Top Flashing Junction

MOUNTING PLATES

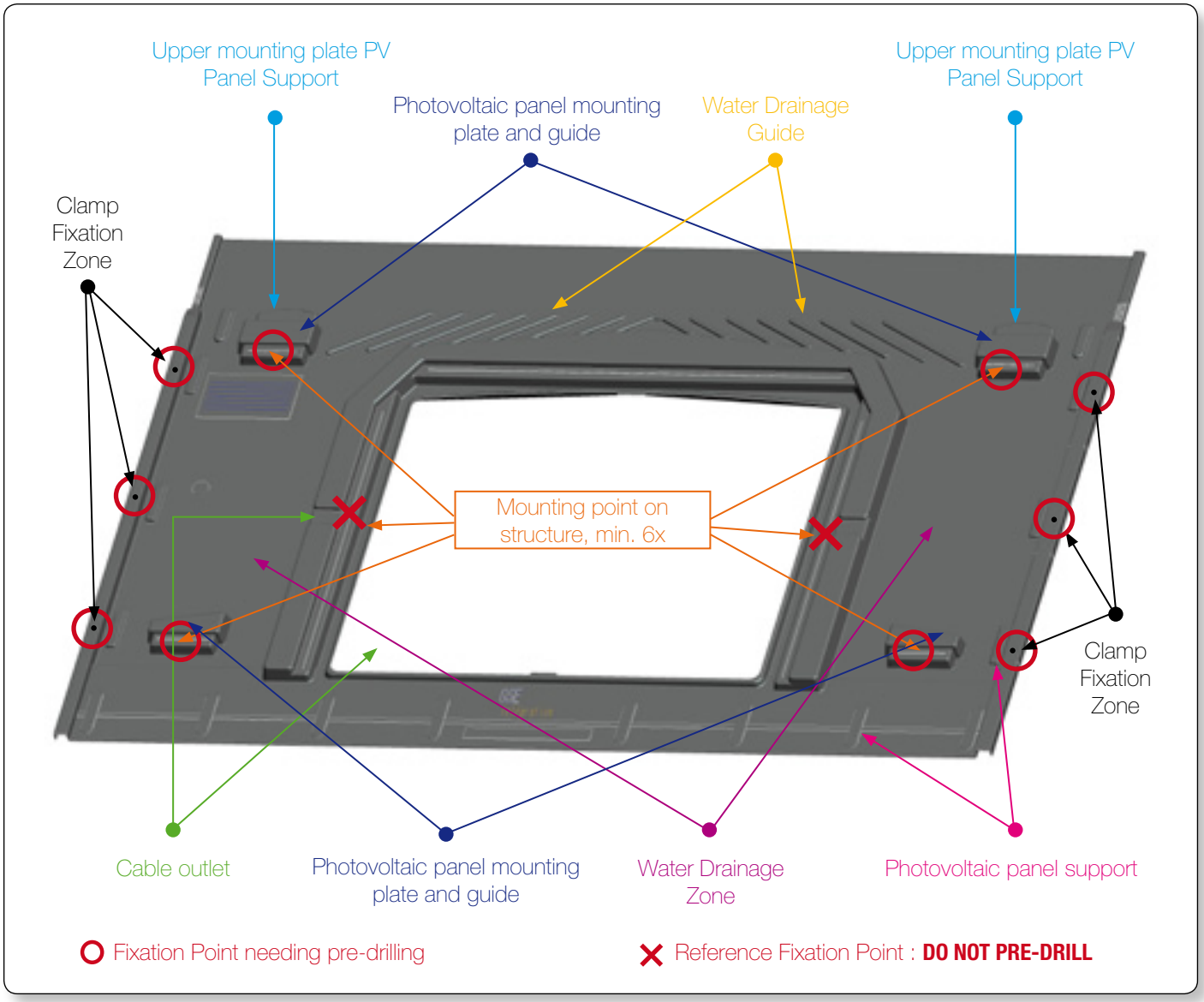
11. Screw 6.5x60mm + EPDM Washer
12. GSE Portrait Plate
13. GSE Landscape Plate
14. Lef tand Right Wedge

WATERPROOFING

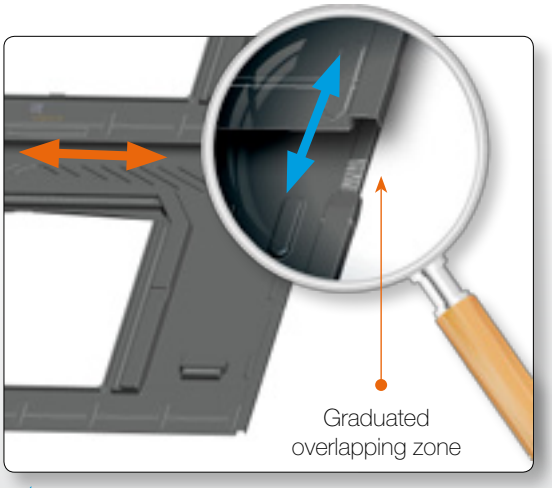
15. Waterproofing Strip
16- Precompressed Seal Rool 20x40mm
17. Roof Underlay Screen

Mounting plate 1.0

PHOTOVOLTAIC PANELS - LANDSCAPE FORMAT


Upper mounting plate PV Panel Support
Photovoltaic panel mounting plate and guide
Water Drainage Guide
Upper mounting plate PV Panel Support
Clamp Fixation Zone
Mounting point on structure, min. 6x
Clamp Fixation Zone
Cable outlet
Photovoltaic panel mounting plate and guide
Water Drainage Zone
Photovoltaic panel support
Fixation Point needing pre-drilling
Reference Fixation Point : DO NOT PRE-DRILL

LANDSCAPE PLATE REFERENCE + MODULE SIZES

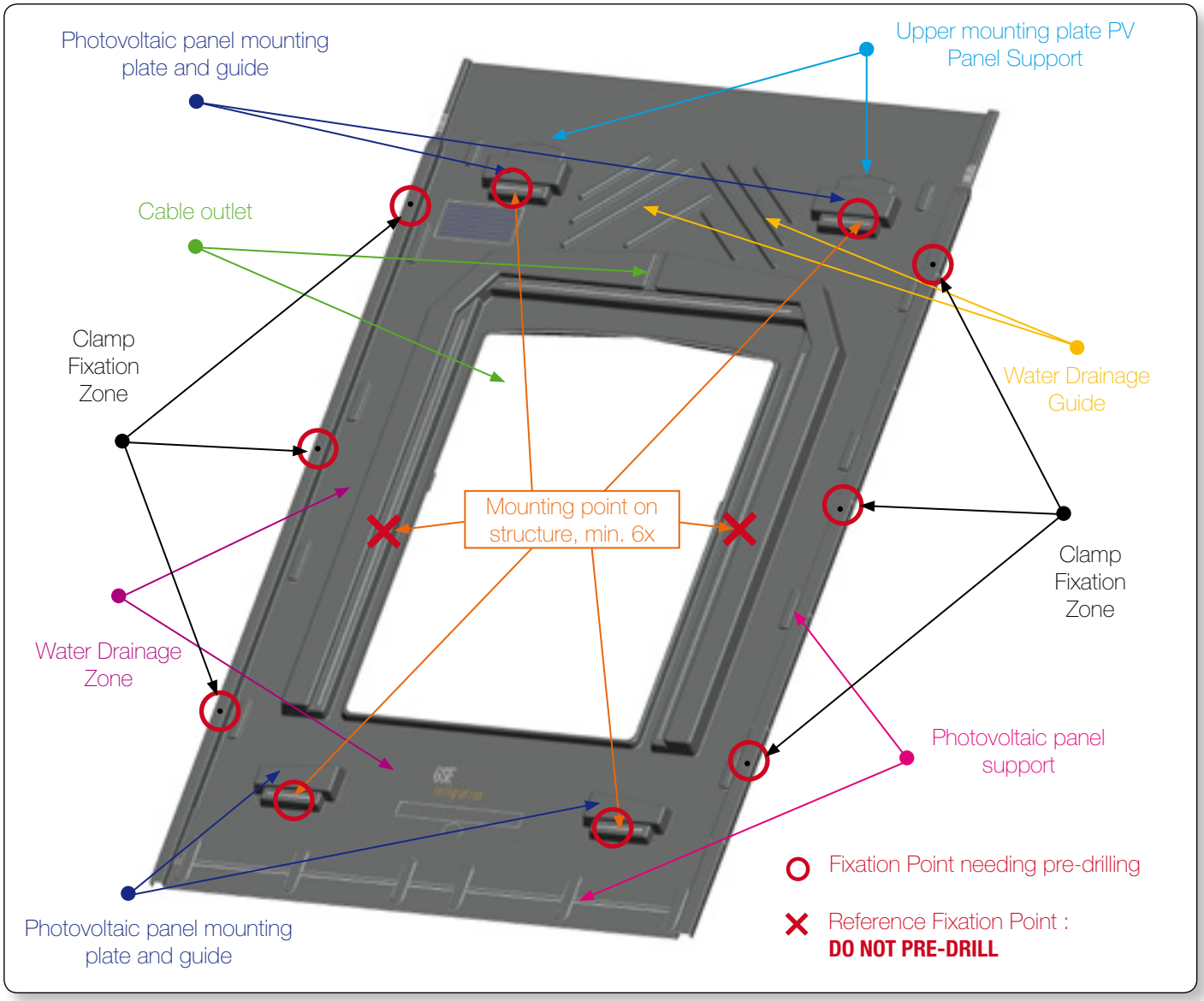


Height Tolerance Width Tolerence

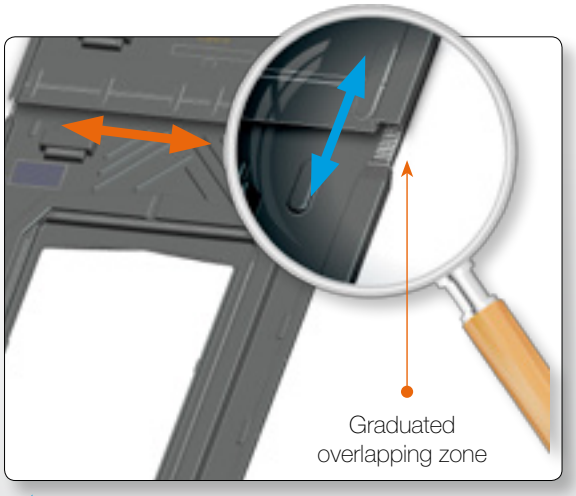
	MODULES TOLERANCE	
REF.	Height (mm)	Width (mm)
1640 / 990-1001	952-1032	1641-1629
1650 / 990-1001	952-1032	1651-1639
1660 / 990-1001	952-1032	1661-1649
1670 / 990-1001	952-1032	1671-1659
1675 / 990-1001	952-1032	1676-1664
1680 / 990-1001	952-1032	1681-1669
1575 / 1082	1042-1122	1576-1564
1559 / 1046-1082	1042-1122	1560-1548
1580 / 808	768-848	1581-1569

Mounting plate 1.1

PHOTOVOLTAIC PANELS - PORTRAIT FORMAT


Photovoltaic panel mounting plate and guide
Upper mounting plate PV Panel Support
Cable outlet
Clamp Fixation Zone
Water Drainage Guide
Mounting point on structure, min. 6x
Clamp Fixation Zone
Water Drainage Zone
Photovoltaic panel support
Photovoltaic panel mounting plate and guide
Fixation Point needing pre-drilling
Reference Fixation Point : DO NOT PRE-DRILL

PORTRAIT PLATE REFERENCE + MODULE SIZES



Height Tolerance Width Tolerence

	MODULES TOLERANCE	
REF.	Height (mm)	Width (mm)
1640 / 992	1600-1680	991-980
1640 / 1001	1600-1680	1002-989
1559 / 1046	1535-1615	1047-1037
1575 / 1069	1535-1615	1070-1058
1575 / 1082	1535-1615	1083-1071
1580 / 808	1540-1608	809-797

Tools required for installation

CHALK LINER

HAMMER

SCREWDRIVER

Adjustable torque necessary

PLATE SHEAR

DRILL BITS

- WOOD AND METAL DRILL BIT ø 10 mm
- 6 PAN BIT ø 8 mm

POP RIVET PLIER

MEASURING TAPE – WHITE MARKER OR PENCIL

ROOF FRAME / WIND ZONE CORRELATION

The indicated values in the tables below apply only for wind zones 1 through 4, and for an altitude inferior to 900 meters.

Note Size in mm

		12 ° to 50 ° normal site (categorie IIIa) 2 roof slopes							
		Zone 1		Zone 2		Zone 3		Zone 4	
		Battens thickness	min board width	Battens thickness	min board width	Battens thickness	min board width	Battens thickness	min board width
Main roof wall 10M height	**Battens spacing ≤ 600** spacing trusses or rafters	15	210	15	260	15	220	15	240
		22	110	22	120	22	150	22	170
		27	100	27	100	27	100	27	110
		40	100	40	100	40	100	40	100
	600 ≤Battens spacing ≤ 900 spacing trusses or rafters	22	150	22	200	22	220	22	250
		27	100	27	120	27	140	27	170
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 metal trusses	40	130	40	130	40	130	40	130
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 (1) Battened frame	22	150	22	150	22	150	22	150
		27	120	27	120	27	120	27	120
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 (1) Metal or wood frame	30	150	30	160	30	200	30	220
		40	100	40	100	40	120	40	130
Side edge 10M height	**Battens spacing ≤ 600** spacing trusses or rafters	15	200	15	220	15	260	15	300
		22	130	22	160	22	180	22	210
		27	100	27	110	27	120	27	150
		40	100	40	100	40	100	40	100
	600 ≤Battens spacing ≤ 900 spacing trusses or rafters	22	200	22	160	22	180	22	210
		27	130	27	160	27	180	27	150
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 metal trusses	40	130	40	130	40	140	40	160
		40	100	40	100	40	100	40	120
	Battens spacing ≤ 1500 (1) Battened frame	22	150	22	150	22	160	22	150
		27	120	27	120	27	130	27	120
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 (1) Metal or wood frame	30	180	30	180	30	180	30	200
		40	100	40	120	40	140	40	160
Angle 10M height	**Battens spacing ≤ 600** spacing trusses or rafters	15	200	15	250	15	280		
		22	140	22	170	22	160	22	160
		27	100	27	120	27	140	27	100
		40	100	40	100	40	100	40	100
	600 ≤Battens spacing ≤ 900 spacing trusses or rafters	22	150	22	170	22	200	22	230
		27	140	27	170	27	200	27	150
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 metal trusses	40	130	40	130	40	150	40	180
		40	100	40	100	40	100	40	120
	Battens spacing ≤ 1500 (1) Battened frame	22	130	22	150	22	180	22	250
		27	100	27	120	27	140	27	160
		40	100	40	100	40	100	40	100
	Battens spacing ≤ 1500 (1) Metal or wood frame	30	140	30	160	30	200	30	250
		40	120	40	130	40	150	40	150

(1): Layout of the woods in the direction of the slope

Implementation prescription 2.0

GSE INTEGRATION MECHANICAL RESISTANCE (PASS'INNOVATION N°2013-221)

TESTED WIND ZONES

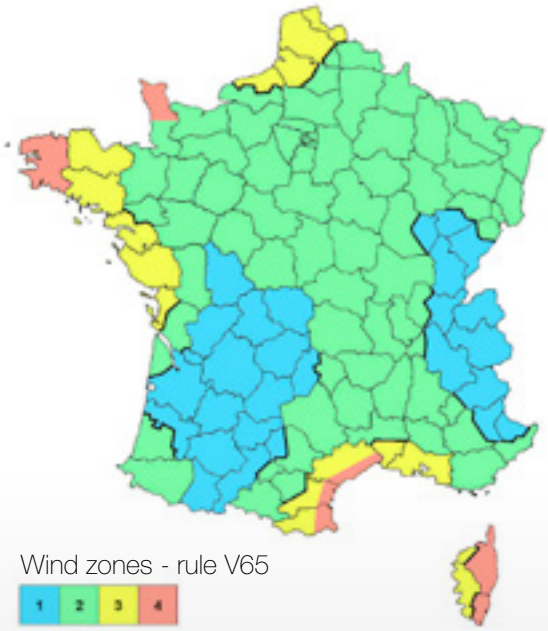
Depression calculation N / m2 (Pa) calculated in the case of slopes plans (V65 with following rules amending No. 2)

Table 1.1 - Slopes Plans - Rolled ribbed steel wood and derived products - New Construction - Buildings closed

Height (m)	Position	Cp	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5	
			Normal	Exposed	Normal	Exposed	Normal	Exposed	Normal	Exposed	Normal	Exposed
10	Main wall	1	875	1 181	1 050	1 365	1 313	1 641	1 575	1 890	2 100	2 520
	Side Edge	1,7	1 488	2 008	1 785	2 321	2 232	2 790	2 678	3 213	3 570	4 284
	Angles	2,4	2 100	2 834	2 520	3 276	3 151	3 938	3 780	4 536	5 040	6 048
15	Main wall	1	963	1 299	1 155	1 502	1 444	1 805	1 733	2 079	2 310	2 772
	Side Edge	1,7	1 637	2 208	1 964	2 553	2 455	3 069	2 946	3 534	3 927	4 712
	Angles	2,4	2 311	3 118	2 772	3 605	3 466	4 332	4 159	4 990	5 544	6 653
20	Main wall	1	1 039	1 403	1 247	1 621	1 559	1 948	1 870	2 244	2 494	2 993
	Side Edge	1,7	1 766	2 385	2 120	2 756	2 650	3 312	3 179	3 815	4 240	5 088
	Angles	2,4	2 494	3 367	2 993	3 890	3 742	4 675	4 488	5 386	5 986	7 183
30	Main wall	1	1 167	1 575	1 400	1 820	1 750	2 188	2 100	2 520	2 800	3 360
	Side Edge	1,7	1 984	2 678	2 380	3 094	2 975	3 720	3 570	4 284	4 760	5 712
	Angles	2,4	2 801	3 780	3 360	4 368	4 200	5 251	5 040	6 048	6 720	8 064
40	Main wall	1	1 269	1 713	1 523	1 979	1 903	2 379	2 284	2 741	3 045	3 654
	Side Edge	1,7	2 157	2 912	2 589	3 364	3 235	4 044	3 883	4 660	5 177	6 212
	Angles	2,4	3 046	4 111	3 655	4 750	4 567	5 710	5 482	6 578	7 308	8 770

x4 Reinforced clamps 2014 (resistance 1860 Pa - security coef. 1.5)

x6 Reinforced clamps 2014 (resistance 3460 Pa - security coef. 1.5)



Wind zones - rule V65

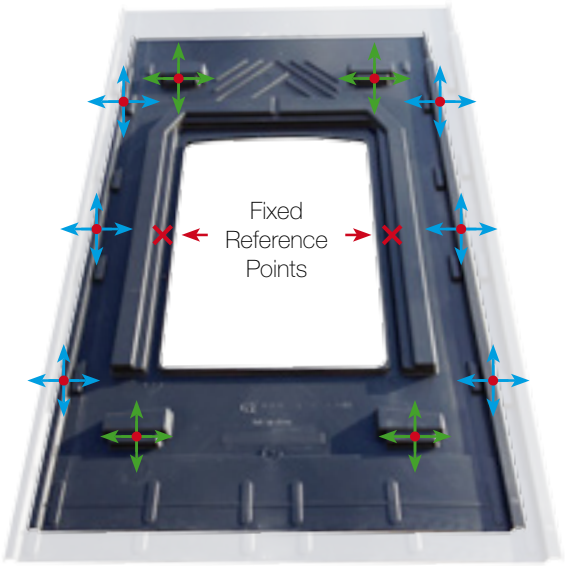
1 2 3 4

Roof zones - rule V65

On a building 15m high, the entire roof surface can be used.

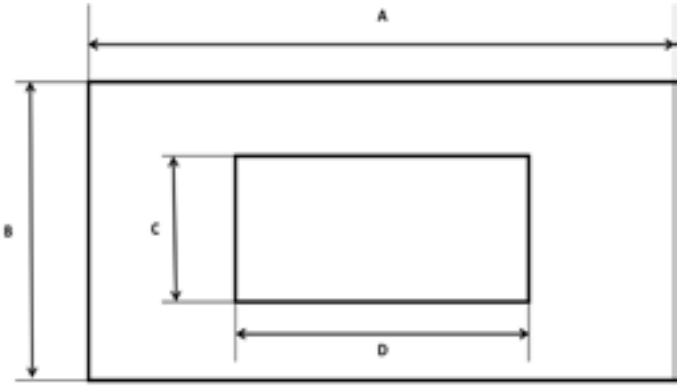
Implementation prescription 3.0

DILATATION (example: GSE Landscape Plate Réf. 1660/992)



Dilatation of the Clamp fixation points

Dilatation of the mounting plate fixation points



mm	0°C	+20°C	+85°C	Stab 1 H
A	1718	1720	1726	1721
B	1155	1158	1161	1158
C	632	634	636	634
D	763	764	767	764

8mm on 4 points = 2mm/point
6mm on 3 points = 2mm/point
4mm on 3 points = 1,33mm/point
4mm on 4 points = 1mm/point

Dilatation of the Clamp fixation points

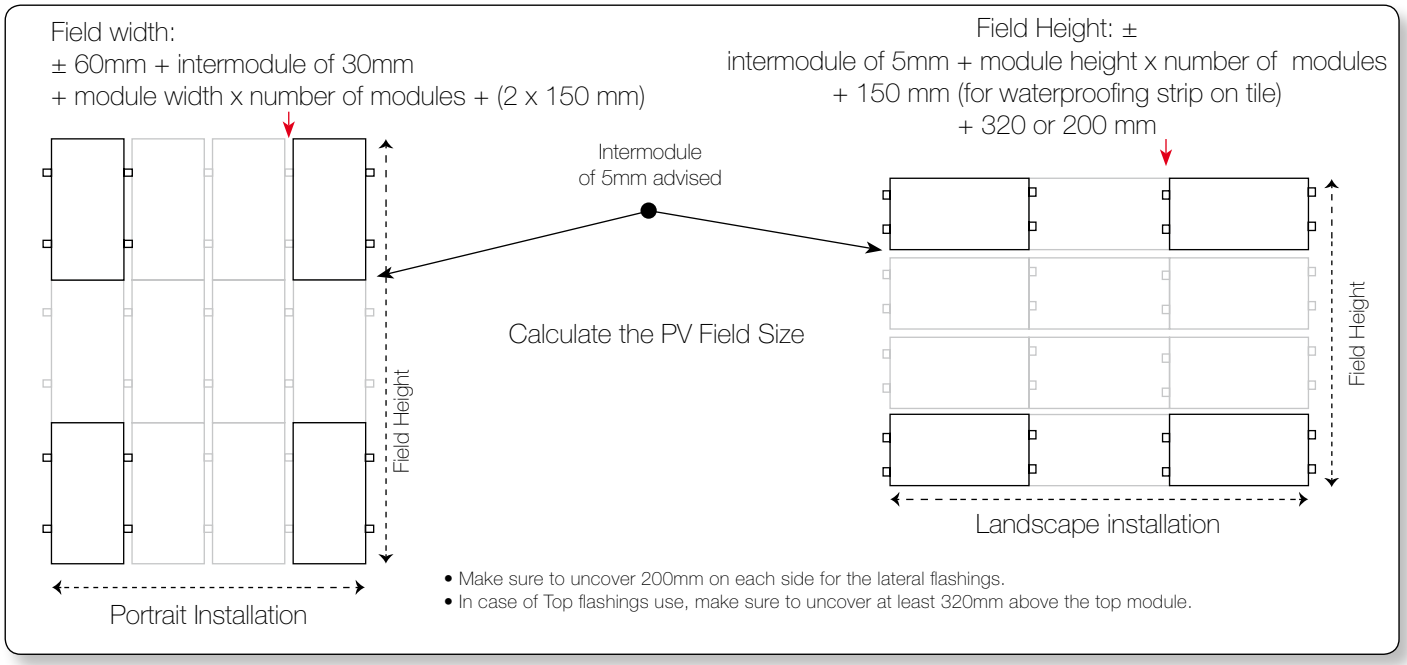
Dilatation of the mounting plate fixation points

The dilatation between the mounting plate and the wood batten requires a pre-drilling of the plate with a ø 10 mm drill bit at the points where you will be fixing your clamps as well as the points where you will be fixing the mounting plate on the roof structure.

Installation Steps 1.0

COVER PREPARATION

Info : Please remember to download our layout calculator at: **www.gseintegration.com,** to help you determine the exact field quotes.

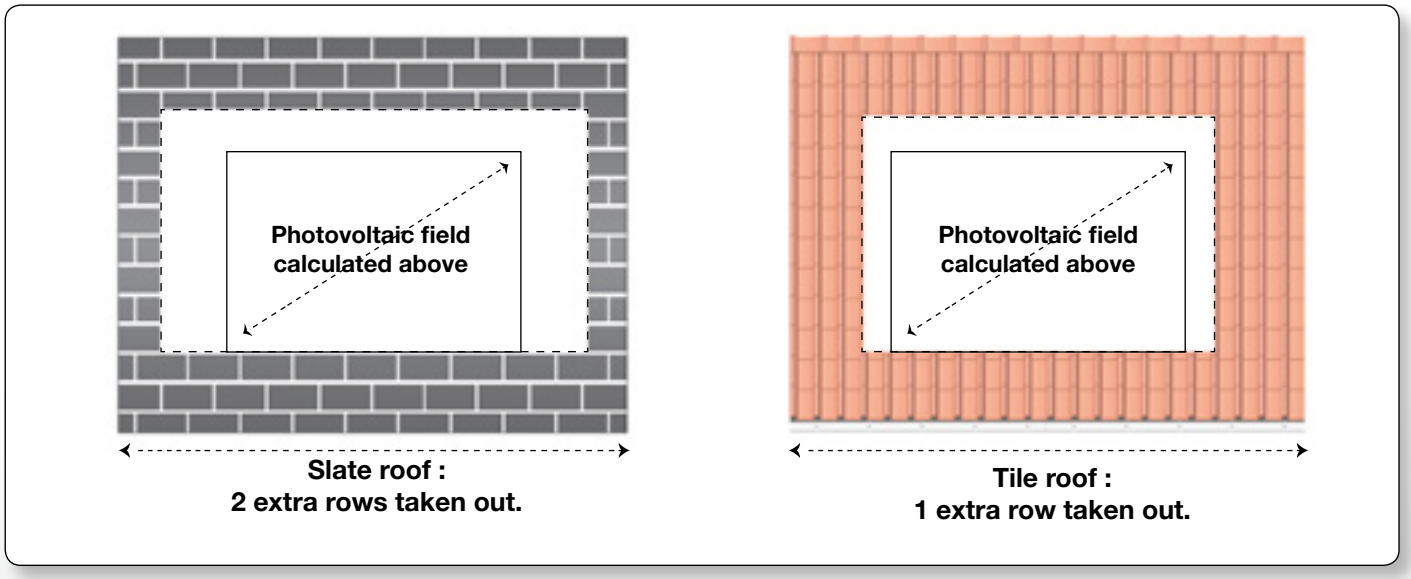

Field width:
± 60mm + intermodule of 30mm
+ module width x number of modules + (2 x 150 mm)
Field Height: ±
intermodule of 5mm + module height x number of modules
+ 150 mm (for waterproofing strip on tile)
+ 320 or 200 mm
Intermodule
of 5mm advised
Calculate the PV Field Size
Field Height
Portrait Installation
Field Height
Landscape installation
• Make sure to uncover 200mm on each side for the lateral flashings.
• In case of Top flashings use, make sure to uncover at least 320mm above the top module.

1) Remove the cover elements on the above-calculated width.

2) Take out an extra row of tiles on the left and on the right (2 rows for slate, or flat tiles)

3) Also remove the cover elements on the calculated height above.

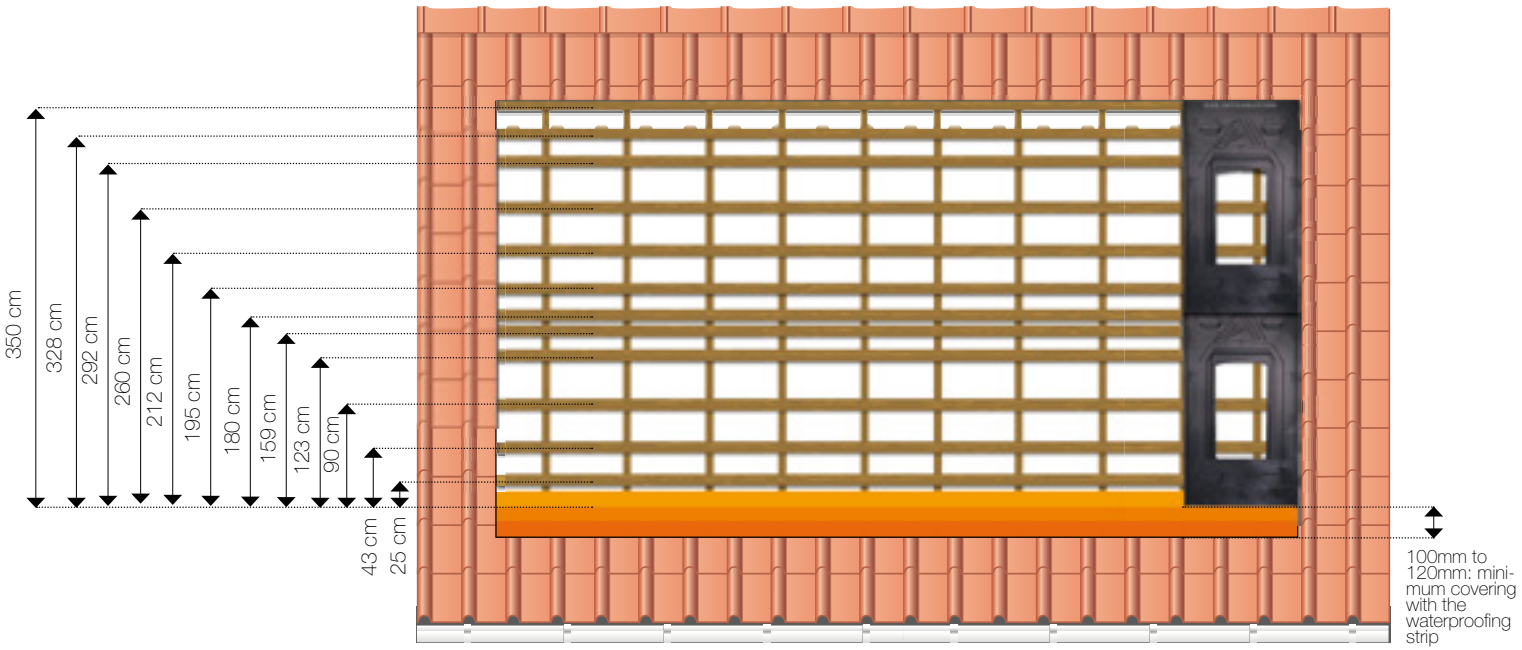
4) Take out one row of tile on the top part (2 rows for slate or flat tiles)



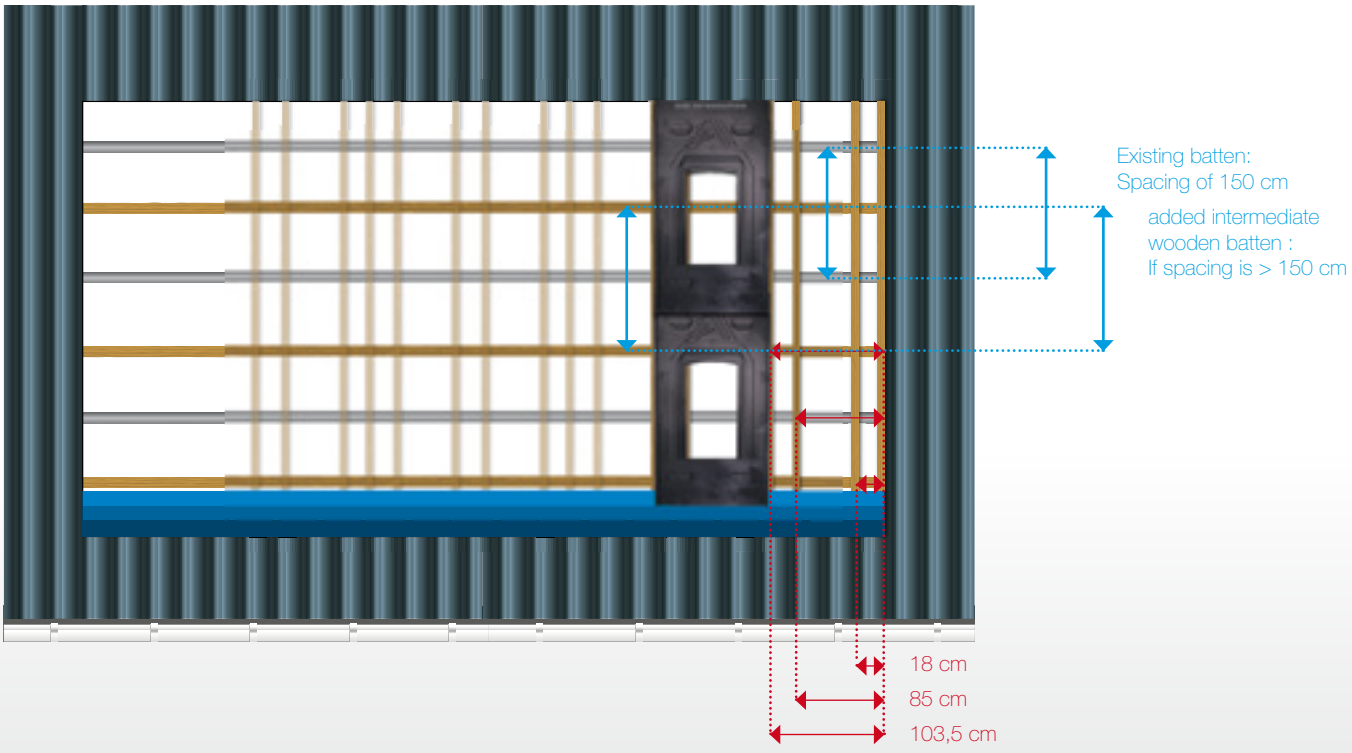
Installation Steps 2.0

LATHING PREPARATION ACCORDING THE THE MOUNTING PLATE

Lathing for Portrait Installation – Traditional Roof Structure (cf. Tables on P.9)
EXAMPLE BELOW: SPACING BETWEEN BATTENS 60cm – LATHING 27x100mm – MODULE 1675mm in Length)



LATHING FOR PORTRAIT INSTALLATION – INSTALLATION ON PAN STEEL (cf. tables on P.9)
EXAMPLE BELOW: SPACING BETWEEN BATTENS 60cm – LATHING 27x100mm – MODULE 1675mm in Length

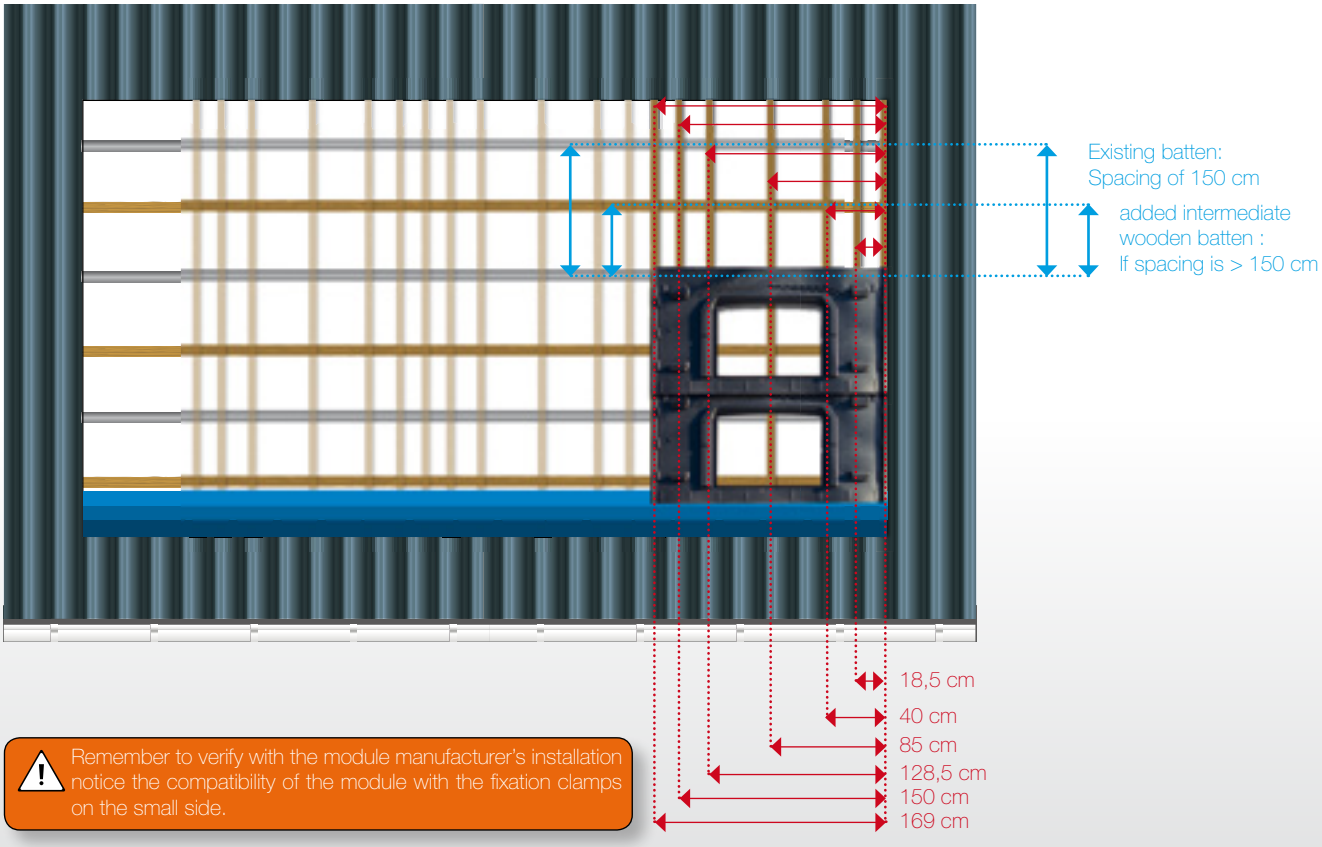


Installation Steps 2.1

LATHING PREPARATION ACCORDING TO THE MOUNTING PLATE

LATHING FOR PORTRAIT INSTALLATION – TRADITIONAL ROOF STRUCTURE (cf. Tables on P.9)
EXAMPLE BELOW: SPACING BETWEEN BATTENS 60cm – LATHING 27x100mm – MODULE 1001mm in Length

LATHING FOR LANDSCAPE INSTALLATION – INSTALLATION ON PAN STEEL (cf. tables on P.9)
EXAMPLE BELOW: SPACING BETWEEN BATTENS 60cm – LATHING 27x100mm – MODULE 1675mm in Length



Remember to verify with the module manufacturer's installation notice the compatibility of the module with the fixation clamps on the small side.

Installation Steps 3.0

INSTALLING THE WATERPROOFING STRIP

1.1) In the case of a shallow slope or thick roofing elements (e.g. curved tiles) or very shaped roofing elements, in order to avoid standing water, install two 2 wood planks dimensioned according to following table (on the entire field width and of sufficient thickness to allow water to be evacuated correctly).

1.2) Unroll the waterproofing strip (self adhesive preferably) on the prepared lathing, making sure that it exceeds the PV field by 20cm on each side.

1.3) Fold back the upper edge of the waterproofing strip around 2cm

1.4) Fold back the right and left ends in the same way.

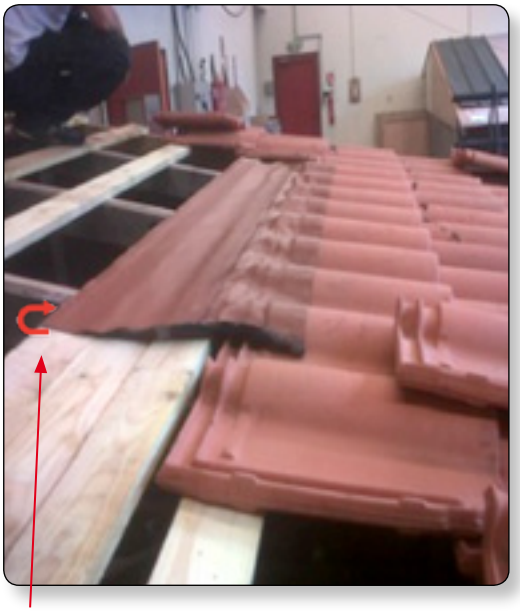
1.5) Firmly press the waterproofing strip onto the first row of tiles, pressing it down smoothly and carefully (ensure that you don't create any water trap zones)

The strip should cover the pan as follows :

- 12 cm for tiles that are very curved (curve of over 3cm)

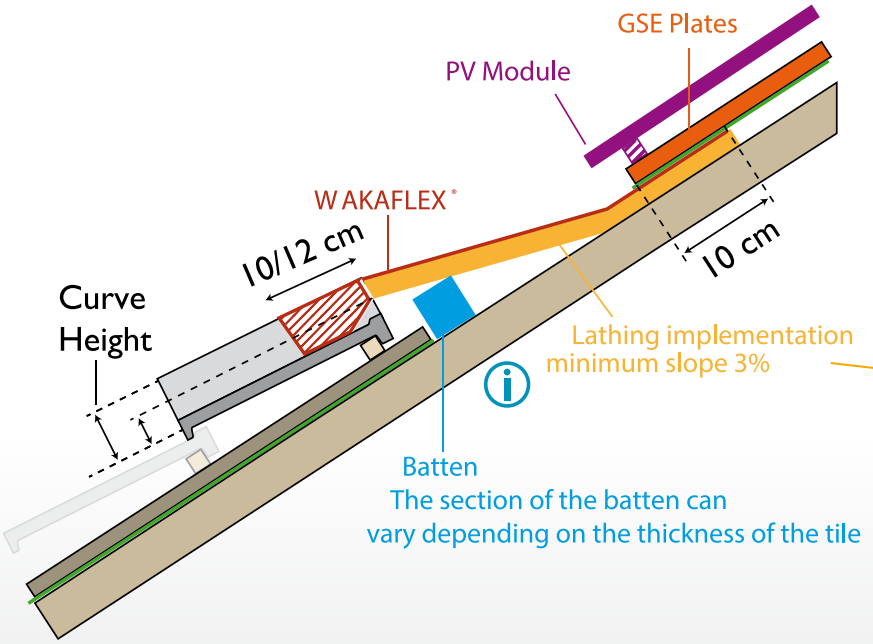
- 10cm for flat tiles or slightly curved (curve of less than 3cm)

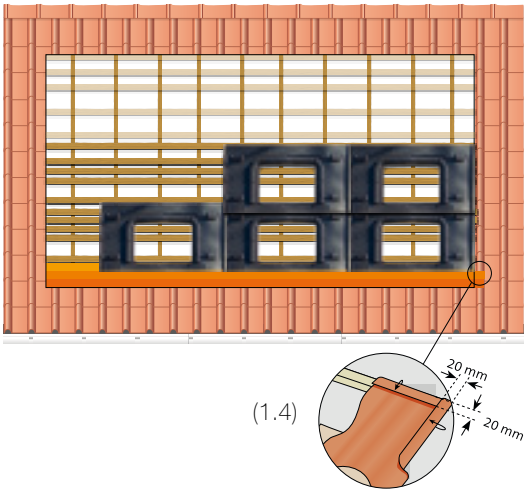
Installation on curved tiles requires a waterproofing strip 45 to 56 cm wide.



Superior edge have to be folded 2cm

IMPLEMENTATION DRAWING





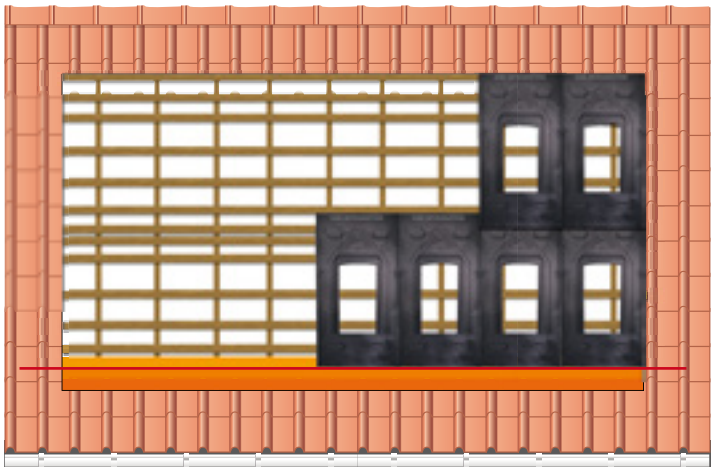
Roof slope (°)	Battens width implementation (mm)
12 tot 16	220
17 tot 19	180
20 tot 24	150
25 tot 50	120

Installation Steps 4.0

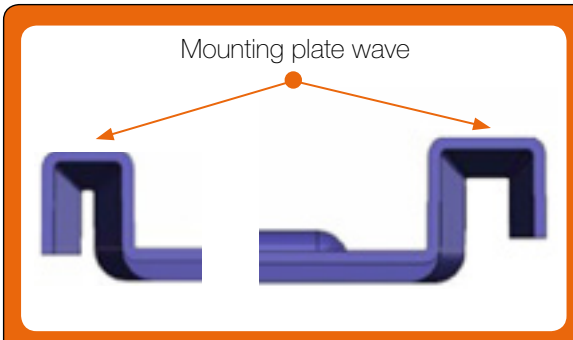
INSTALLING THE FIRST ROW OF MOUNTING PLATES

1.1) Using the chalk liner, mark a line on the waterproofing strip, parallel to the battens and 15 cm to 20 cm below the top edge of the waterproofing strip.
The plate will cover 12 cm.

1.2) Position the first mounting plate in the bottom right-hand corner of the uncovered area, aligned with the chalk liner mark. Install the mounting plate.
Screw the mounting plate using the 2 central fixing points that do not need pre-drilling (see mounting recommendations on pages 6, 7, 13 and 14).



1.3) Place your second mounting plate next to the first one, making sure that they interlock. Same for the mounting plates on the second row and the rows above, etc.



⚠ 1.4) **Using the pencil or white marker, mark the future clamp fixation points,** on the mounting plates waves, according to the lathing that has been implemented. Once the plates have been installed, these marks will allow you to fix the clamps at the right position, and aligned. (see fixation recommendations on pages 9 to 17).

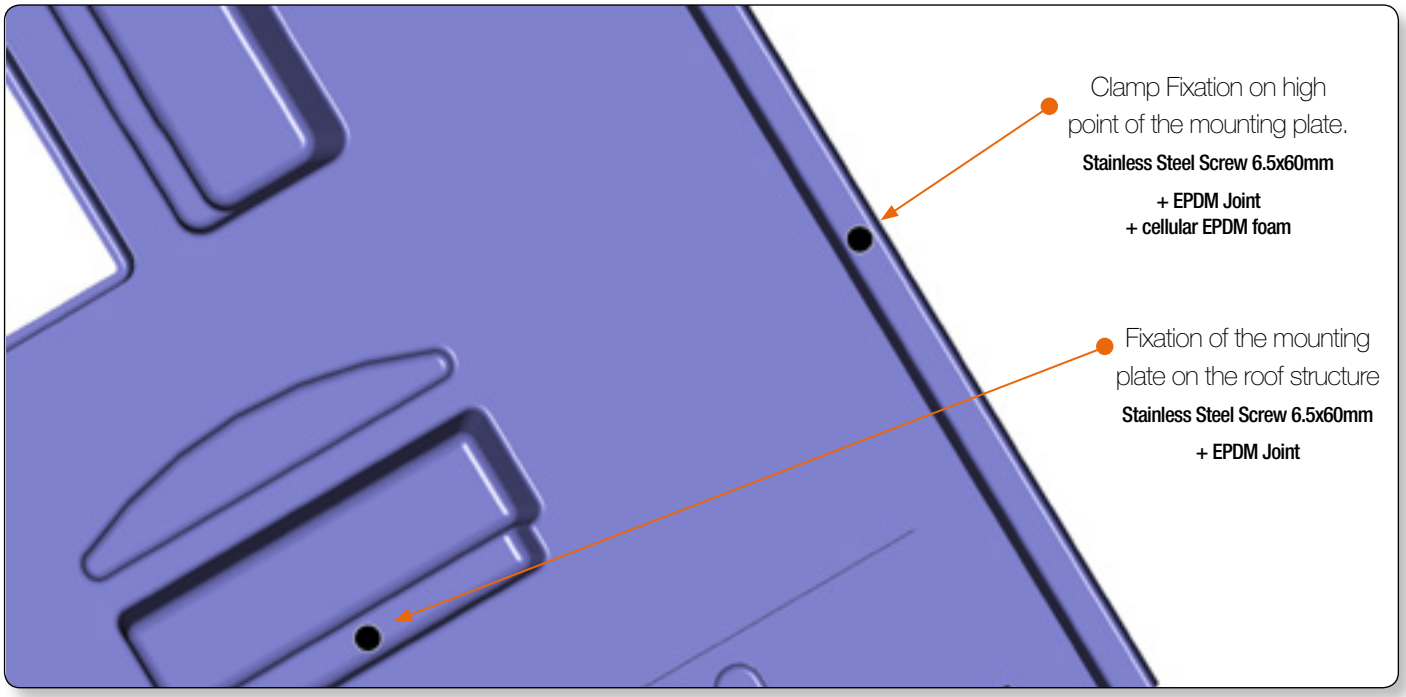
Tip : : To determine the placement of fixation of the clamps on the module, you can use the module cells as marks.

INSTALLATION THE FOLLOWING ROWS OF MOUNTING PLATES

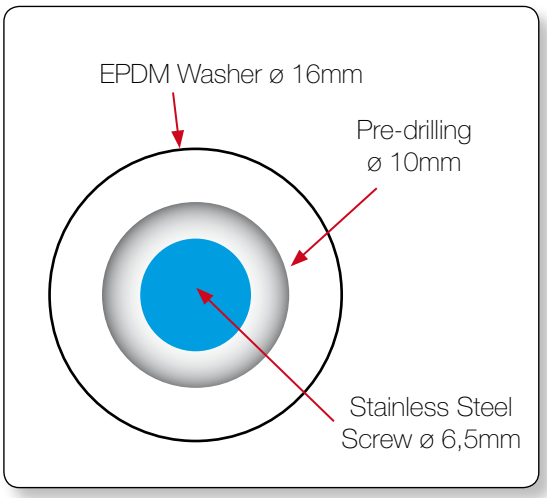
The mounting plates above need to overlap the mounting plates below all the way until in contact with the dedicated stops.
The overlap hence will be of 12 to 16cm depending on your module height. (p. 6/7)

Installation Steps 5.0

PRE-DRILLING OF THE MOUNTING PLATES WITH A DRILL BIT OF ø 10 mm

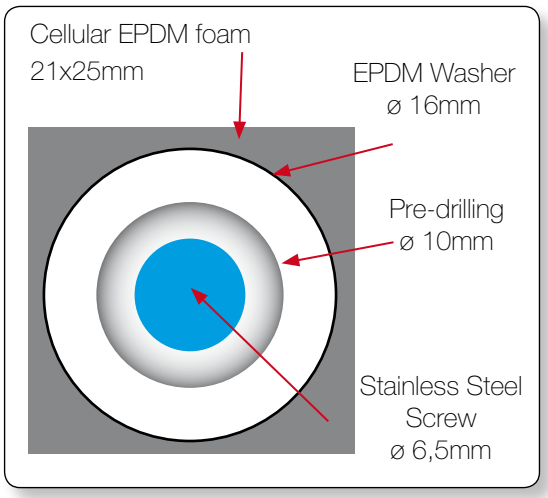

Clamp Fixation on high point of the mounting plate.
Stainless Steel Screw 6.5x60mm
+ EPDM Joint
+ cellular EPDM foam
Fixation of the mounting plate on the roof structure
Stainless Steel Screw 6.5x60mm
+ EPDM Joint

Fixation and preparation of the mounting plates



Mounting plate to roof structure fixation drawing (only 4 of the 6 fixation points)

Stainless Steel Screw 6.5x60mm + EPDM Joint



Clamp fixation drawing on the mounting plate

Stainless Steel Screw 6.5x60mm + EPDM Joint + cellular EPDM foam

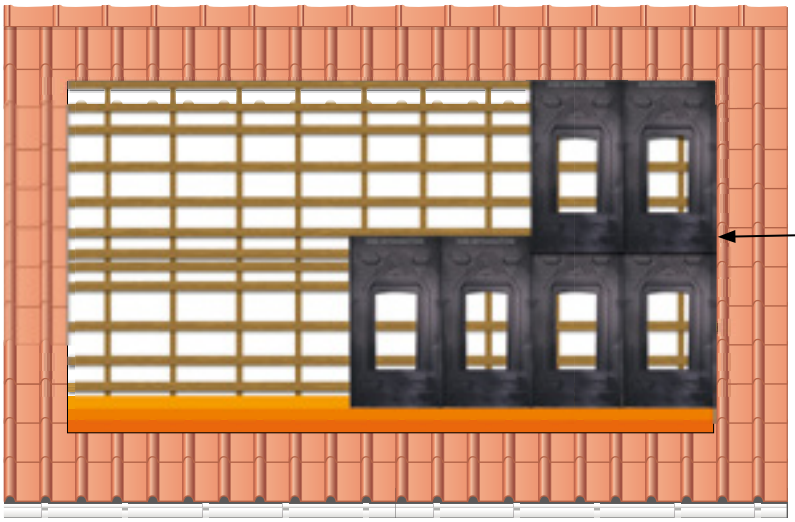
Make sure to correctly position the screw at the center of the pre-drilled hole in order to ensure waterproofing longevity. A tolerance has been calculated to this effect during the product design phases.

Installation Steps 5.1

REMINDER

⚠ During the preparation of the roof structure, it is necessary to install a roof underlay screen, up to the gutter.

DIRECTION OF THE APPLICATION

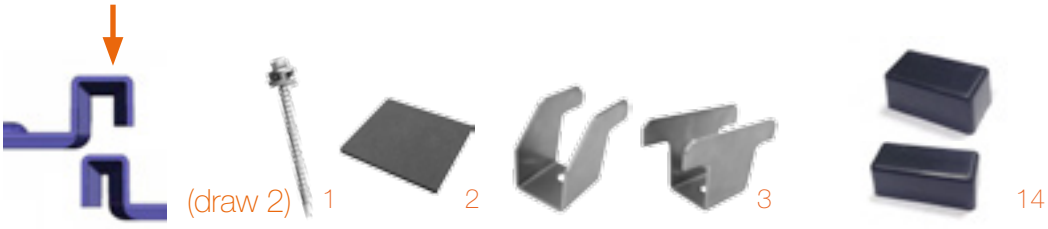


Please remember to overlap the mounting plates, 12cm to 16 cm, depending on your module size.
(You can adjust this overlap with the graduation on the mounting plate – (cf. "GSE Intgration Plates adjustment" Section).

The mounting plates are preferably installed from right to left but can also be installed left to right (make sure the plates are properly interlocked)

Installation Steps 6.0

CLAMPS FIXATION



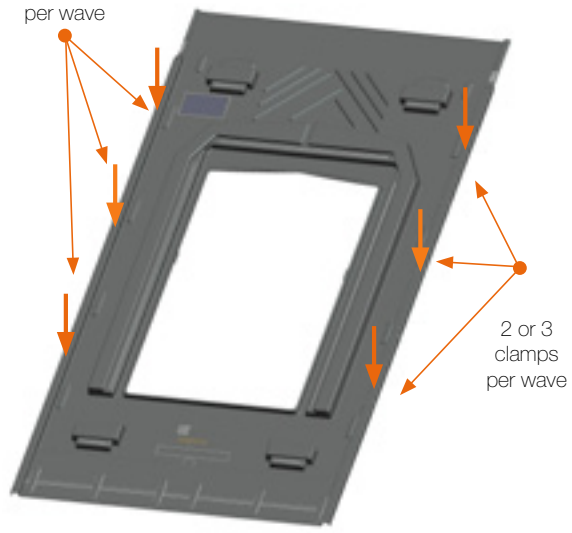
The clamps are to be fixed only on the mounting plate edge (draw 2)
Attach the clamps (3) using the screws to this effect (1) making sure to stick the EPDM foam (2) between the clamp and the mounting plate to ensure waterproofness.

For single clamps fixation, make sure to position the left and right wedges (14) correctly inside the edge of the mounting plates.

Make sure the wedges are positioned before the lateral flashings.

⚠ Make sure to fix the clamps on the wood battens. It is imperative to stick the EPDM foam (2) under the clamp (between the mounting plate and the clamp).

FIXING THE CLAMPS ON THE MOUNTING PLATES



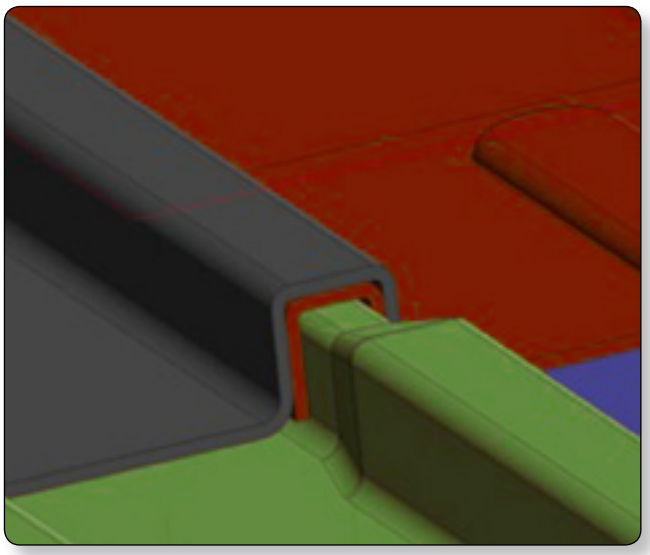
The use of the various clamps varies according to the wind zones, but needs also to respect the PV module manufacturer's recommendations.

The majority of PV modules have a resistance to wind depression of 2400Pa. The reinforced clamps being valid all the way to 3400Pa, it is important to have the manufacturer's authorization to go over 2400 Pa (cf Table p.10)

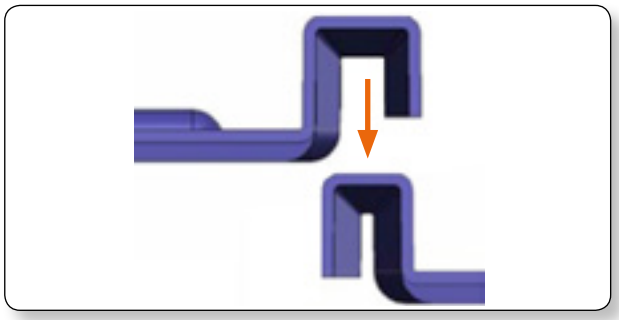
Installation Steps 6.1

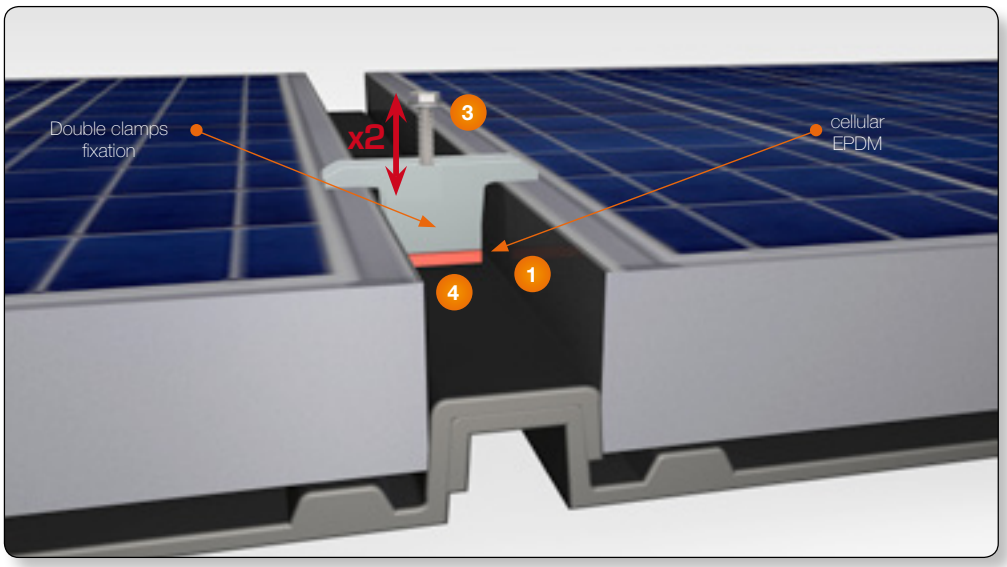
NOTE

Make sure you interlock the mounting plates correctly in order to ensure proper waterproofing of the system.

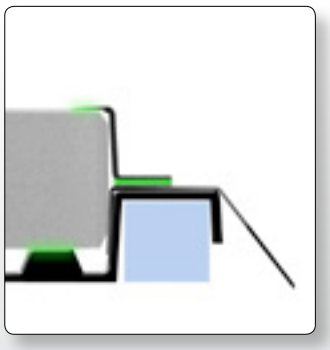


View of 4 interlocked mounting plates





1. Stick the cellular EPDM foam under the clamp
2. Tighten the screw once and take it out
3. Repeat
4. Tighten the clamp in its position



◀ Clamps attachment points on the PV panel after screwing.

Installation Steps 7.0

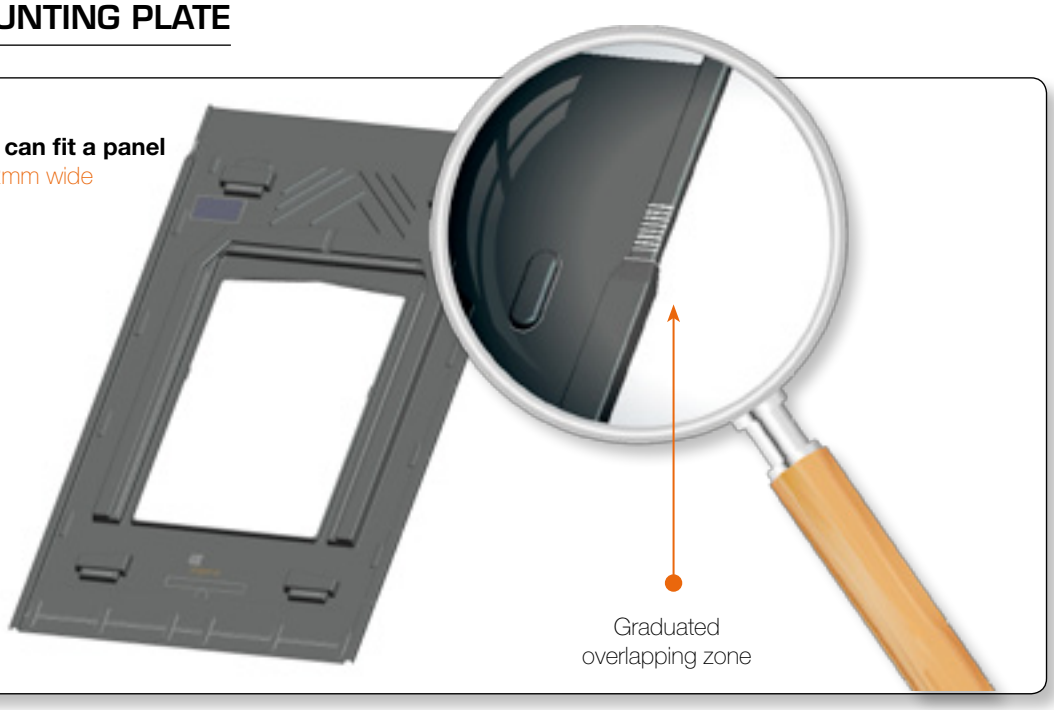
GSE PLATES ADJUSTMENT

The GSE Integration Plates are adjustable according to your panel size.
In order to adjust the GSE plates, use the graduations on the plate. The graduation vary from 0 to 40 mm.

⚠ After having screwed all the mounting plates at the 2 center points, you can start preparing your ø 10 mm drill bit. And pre-drill all the other holes on the plate, that means 4 pre-drills on top of the 2 fixing points already made.

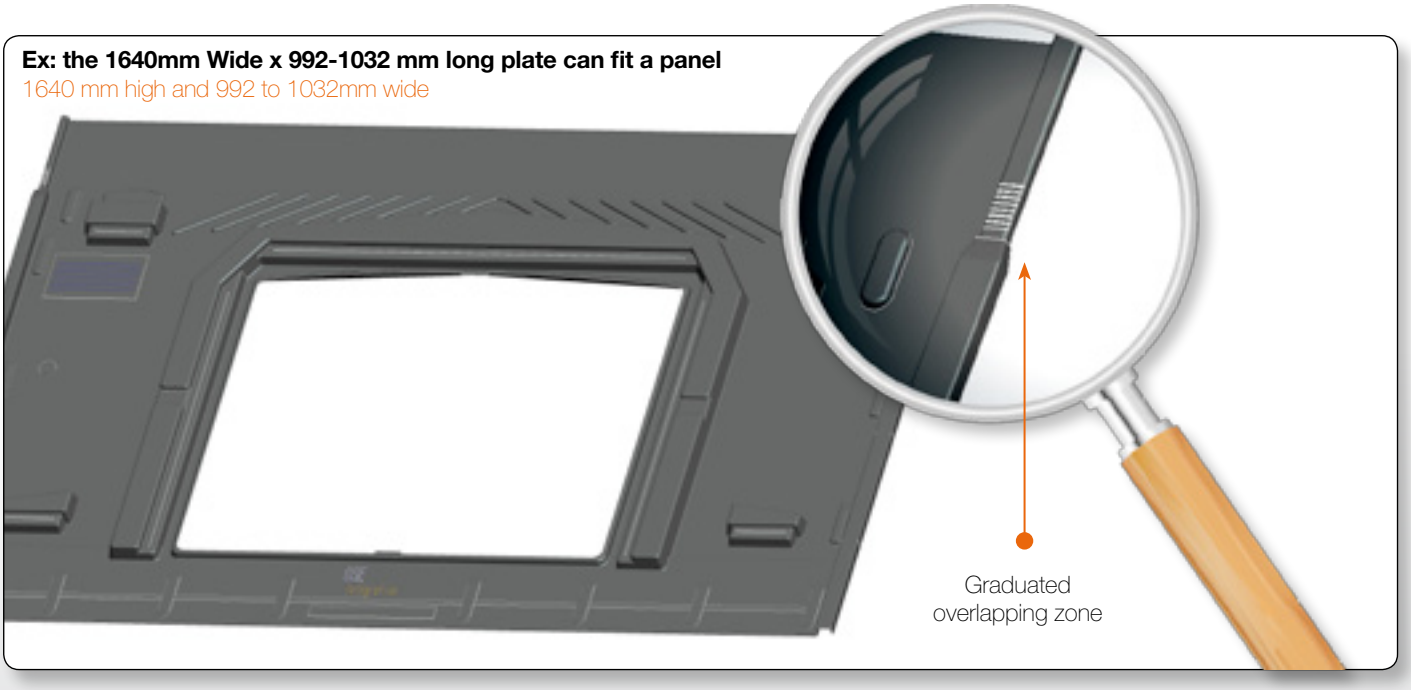
GSE PORTRAIT MOUNTING PLATE

Ex:
the H1640-80mm x W992mm can fit a panel
1640 to 1680 mm high, and 992mm wide



GSE LANDSCAPE MOUNTING PLATES

Ex: the 1640mm Wide x 992-1032 mm long plate can fit a panel
1640 mm high and 992 to 1032mm wide



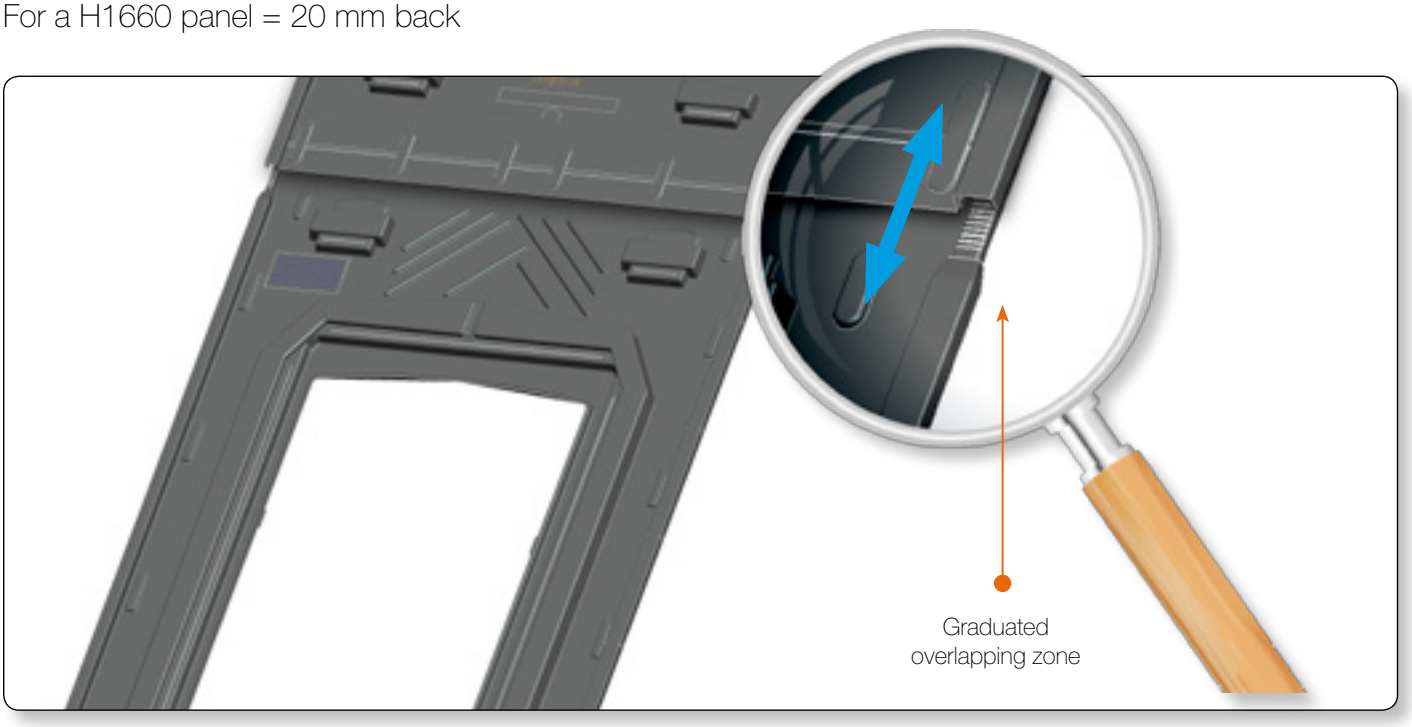
*Cf. Tables on p.6-7

Installation Steps 7.1

ADJUSTMENT EXAMPLES (1650 MM MODULES IN PORTRAIT)

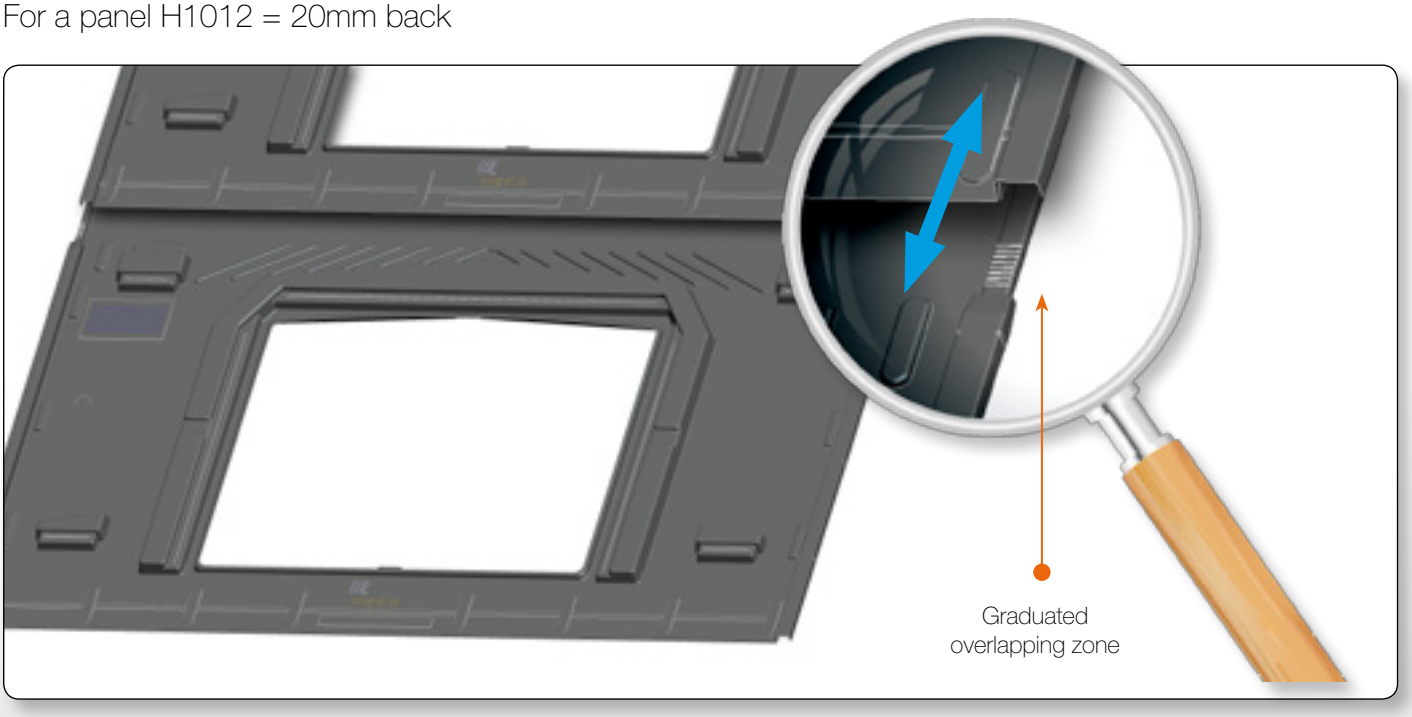
GSE PORTRAIT MOUNTING PLATE (H1640-80mm X W992mm)

For a H1650 mm panel, position the plate at 10mm back
For a H1660 panel = 20 mm back



GSE LANDSCAPE MOUNTING PLATE (W1640mm X H992-1032mm)

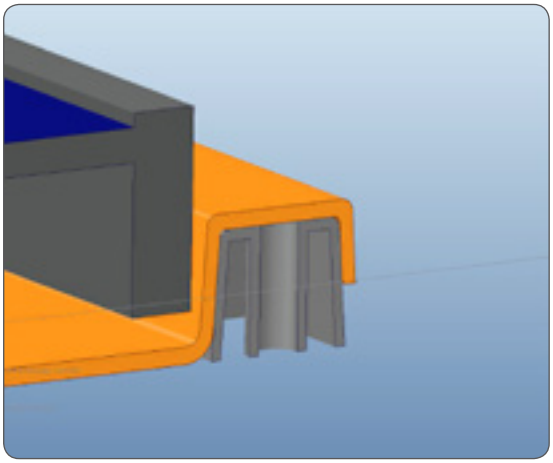
For a panel H1002, position the plate at 10mm back
For a panel H1012 = 20mm back



Installation Steps 8.0

WEDGES POSITIONNING

The 2014 Version of the GSE Intgration System requires positioning wedges on the lateral parts of the field.



These wedges are to be placed under the plate wave at the edge, right under where the clamps will be fixed.

- Please note that there is a left and a right wedge

- The wedge will be drilled with the plate and lateral flashing, before fixing the single clamp.

Installation Steps 9.0

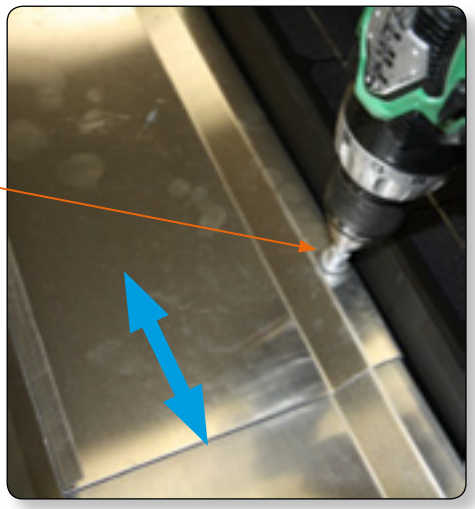
INSTALLATION OF THE LATERAL FLASHINGS

1.1) Position the lateral flashings overlapping the waves on the right and left edges of the integration system.

1.2) Use a screw 4.8x25mm at the junction of 2 lateral flashings to fix them together.

1.3) Then, position the single clamp where you marked the mounting plates. Mark the pre-drilling point on the lateral flashing.

1.4) Pre-drill a 10mm hole, making sure you go through the lateral flashing, the plate and the wedge.



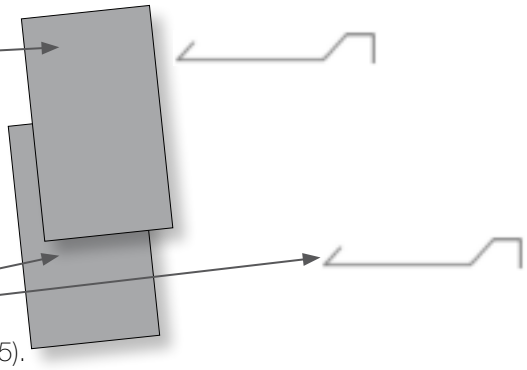
Overlapping of 15 cm

The flashings interlock each other, with the top part over the bottom part to allow proper water drainage

1) Open the lateral clip over 10 to 15 cm (lower lateral flashing).
2) Interlock the upper lateral flashing on the lower one, then re-close the clip
3) Fix the lateral flashing to the roof structure using the flashing hooks (5)

Upper lateral flashing to be interlocked on the lower one.

Open the lateral clip over 10 to 15 cm. Position and install the upper skirt and clip, and close the clip.



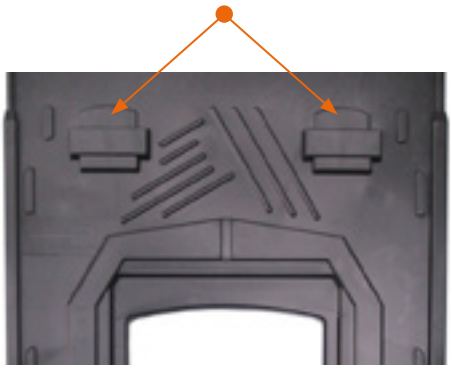
Fix the lateral flashing on the battens using the flashing hooks (5).

⚠ The overlap of one lateral flashing on top of the other needs to be 15 cm

Installation Steps 10.0

INSTALLING THE PHOTOVOLTAIC PANELS

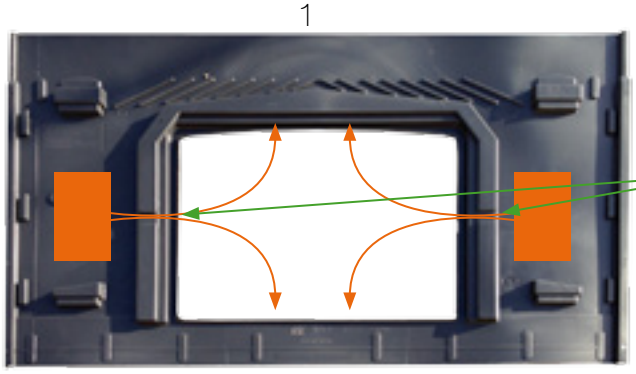
Place the first row of panels on the mounting plates.
The panel is installed on the 2 upper supports on the plate.



PASSING THE CABLES (1)

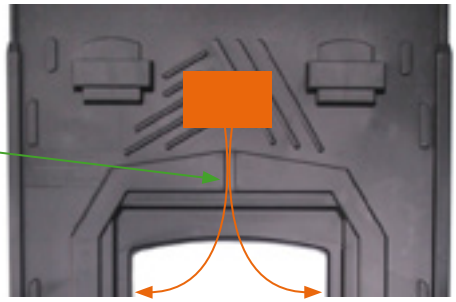
Note:
Cables must transit from one panel to the next through the dedicated cable outlets :
Slot through the central protection pad

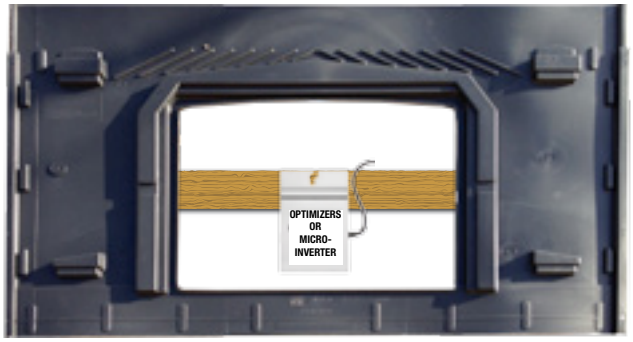
1



(1 & 2)
Passing
the cables

2





If you are using optimizers or micro-inverters, you can fix them in the center hole of the mounting plate, on the visible wood battens without risking the module to press on your equipment.

Compatibility approved for :

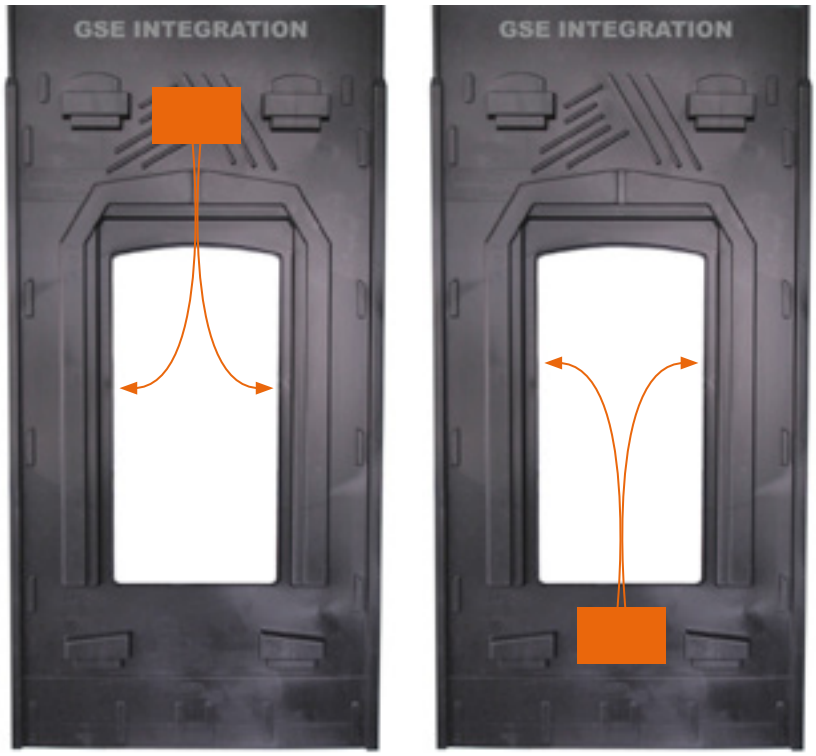
enphase ENERGY solaredge enecsys

Installation Steps 10.1

PASSING THE CABLES

Panels should be connected horizontally when installed in portrait format.
The panel can be installed upright or inverted.

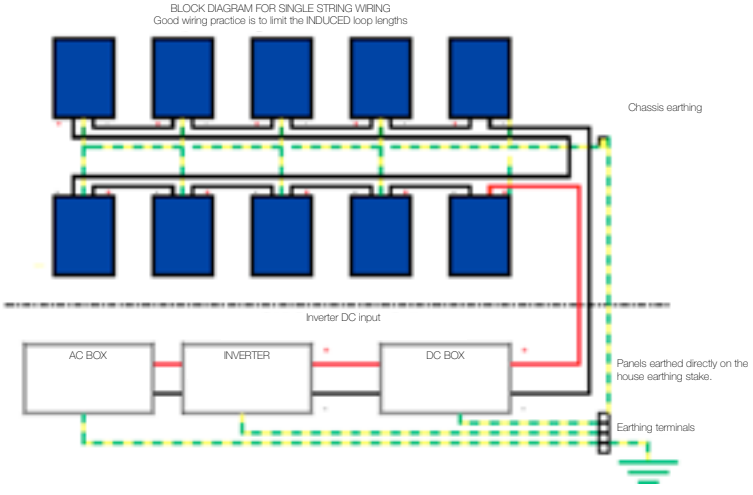
INSTALLATION FOR PANELS OF MINIMUM 40MM THICKNESS



INSTALLATION FOR PANELS OF THICKNESS between 31mm and 50mm

ELECTRICALLY EARTHING THE PANELS

The photovoltaic panel should be earthed through the dedicated hole in alloy frame of the photo-voltaic panel


BLOCK DIAGRAM FOR SINGLE STRING WIRING
Good wiring practice is to limit the INDUCED loop lengths
Chassis earthing
Inverter DC input
AC BOX
INVERTER
DC BOX
Panels earthed directly on the house earthing stake.
Earthing terminals

Installation Steps 10.2

MOUNTING THE PHOTOVOLTAIC PANELS

1/ For fixation of the PV Panel to the plate you will have to use one of the two possible clamps (cf. p.14 or below)

2/ use the pre-drilled holes (1.4 p.24) in the lateral flashings and the wedges to position your 3 clamps per panel side. ???

3/ Before fixing the clamps, stick the EPDM Joint under the clamps to ensure waterproofing. Use the 6.5x60mm screw supplied.

4/ The double clamps fix the panels 2 by 2 and align to the single clamps.

5/ The single clamps are fixed at the edge of the PV Field, align to the double clamps and are position over the wedges that are under the plate wave.

BE CAREFUL TO SCREW THE ELEMENTS WITH THE RIGHT FORCE

Too weak correct Too strong

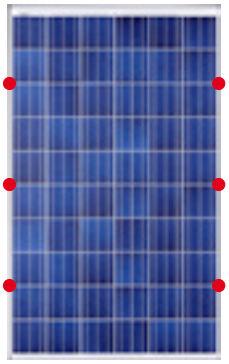
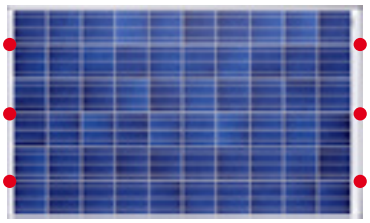
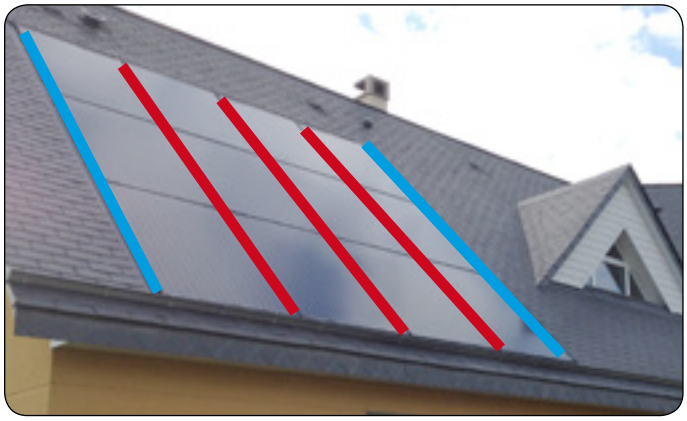


Diagram of clamps positioning



For landscape fixation, please refer to the PV panel manufacturer's notice.



Single Clamps Double Clamps

TESTED WIND ZONES

Height (m)	Position	Cp	Zone 1 Normal	Zone 1 Exposed	Zone 2 Normal	Zone 2 Exposed	Zone 3 Normal	Zone 3 Exposed	Zone 4 Normal	Zone 4 Exposed	Zone 5 Normal	Zone 5 Exposed
10	Main wall	1	875	1 181	1 050	1 365	1 313	1 641	1 575	1 890	2 100	2 520
	Side Edge	1,7	1 488	2 008	1 785	2 321	2 232	2 790	2 678	3 213	3 570	4 284
	Angles	2,4	2 100	2 834	2 520	3 276	3 151	3 938	3 780	4 536	5 040	6 048
15	Main wall	1	963	1 299	1 155	1 502	1 444	1 805	1 733	2 079	2 310	2 772
	Side Edge	1,7	1 637	2 208	1 964	2 553	2 455	3 069	2 946	3 534	3 927	4 712
	Angles	2,4	2 311	3 118	2 772	3 605	3 466	4 332	4 159	4 990	5 544	6 653
20	Main wall	1	1 039	1 403	1 247	1 621	1 559	1 948	1 870	2 244	2 494	2 993
	Side Edge	1,7	1 766	2 385	2 120	2 756	2 650	3 312	3 179	3 815	4 240	5 088
	Angles	2,4	2 494	3 367	2 993	3 890	3 742	4 675	4 488	5 386	5 986	7 183
30	Main wall	1	1 167	1 575	1 400	1 820	1 750	2 188	2 100	2 520	2 800	3 360
	Side Edge	1,7	1 984	2 678	2 380	3 094	2 975	3 720	3 570	4 284	4 760	5 712
	Angles	2,4	2 801	3 780	3 360	4 368	4 200	5 251	5 040	6 048	6 720	8 064
40	Main wall	1	1 269	1 713	1 523	1 979	1 903	2 379	2 284	2 741	3 045	3 654
	Side Edge	1,7	2 157	2 912	2 589	3 364	3 235	4 044	3 883	4 660	5 177	6 212
	Angles	2,4	3 046	4 111	3 655	4 750	4 567	5 710	5 482	6 578	7 308	8 770

x4 Reinforced clamps 2014 (resistance 1860 Pa - security coef. 1.5)

x6 Reinforced clamps 2014 (resistance 3460 Pa - security coef. 1.5)

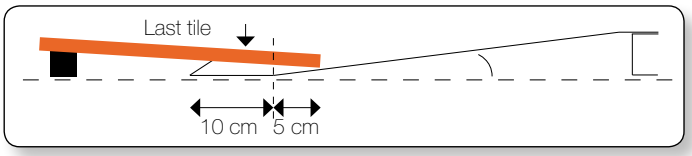
*Cf table p. 9-10

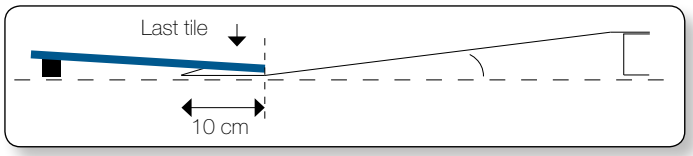
Installation Steps 11.0

INSTALLING THE TOP FLASHINGS

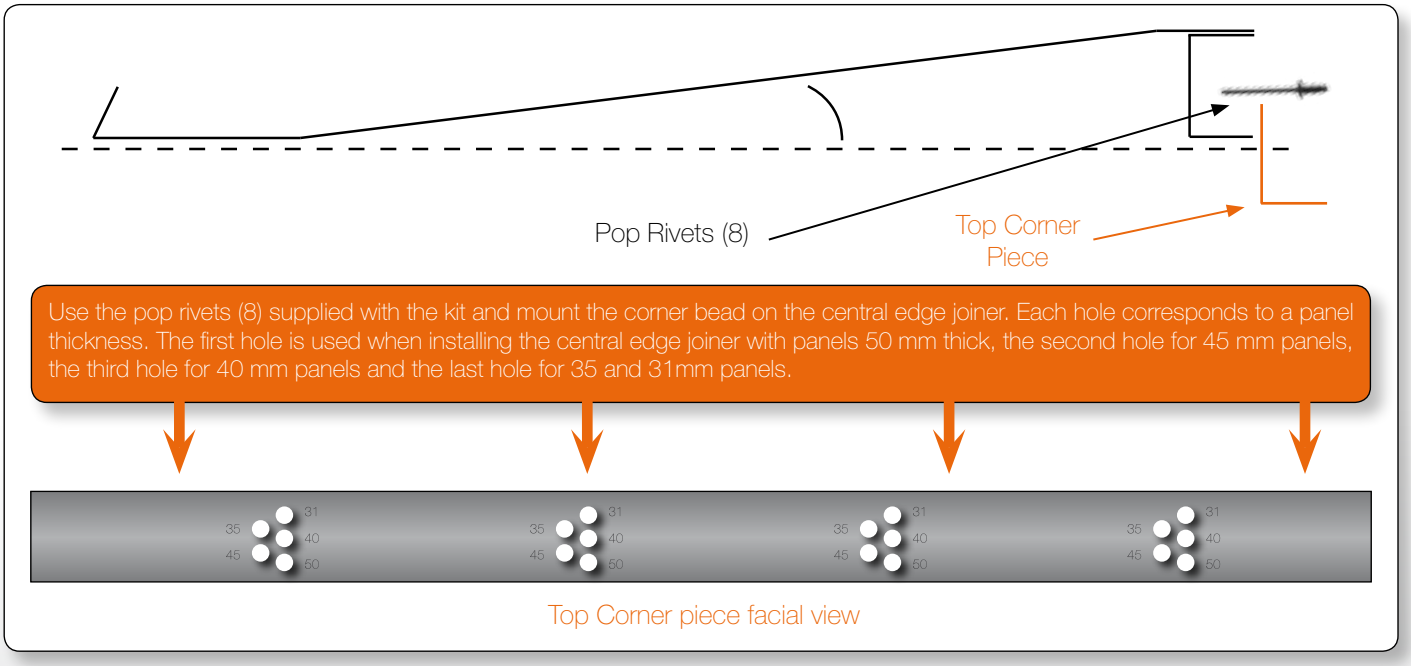
1/ The tile or zinc covering the top flashings should be at least of 15 cm. In case of a shallow slope or a tile of high curve, the covering should be more.

2/ On slate, a 10cm covering is enough.





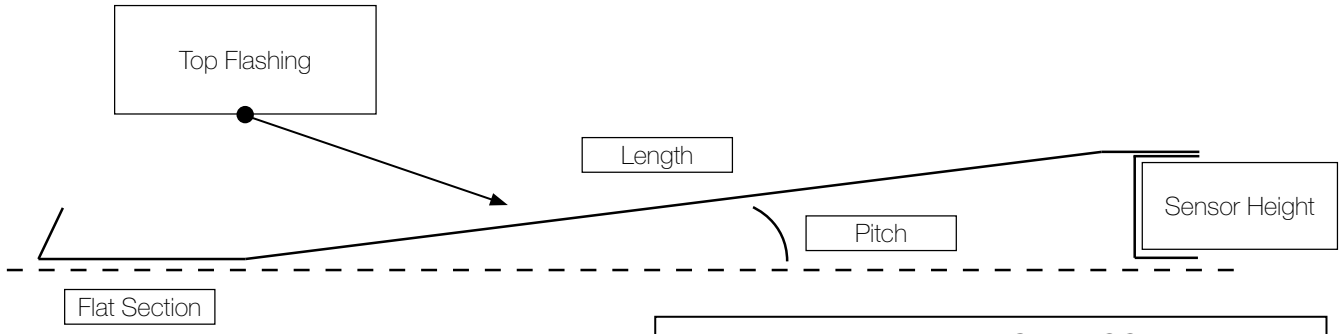
PREPARATION OF THE TOP CORNER PIECE (FOR TOP CENTER FLASHING)


Pop Rivets (8)
Top Corner Piece
Use the pop rivets (8) supplied with the kit and mount the corner bead on the central edge joiner. Each hole corresponds to a panel thickness. The first hole is used when installing the central edge joiner with panels 50 mm thick, the second hole for 45 mm panels, the third hole for 40 mm panels and the last hole for 35 and 31mm panels.
35
45
31
40
50
Top Corner piece facial view

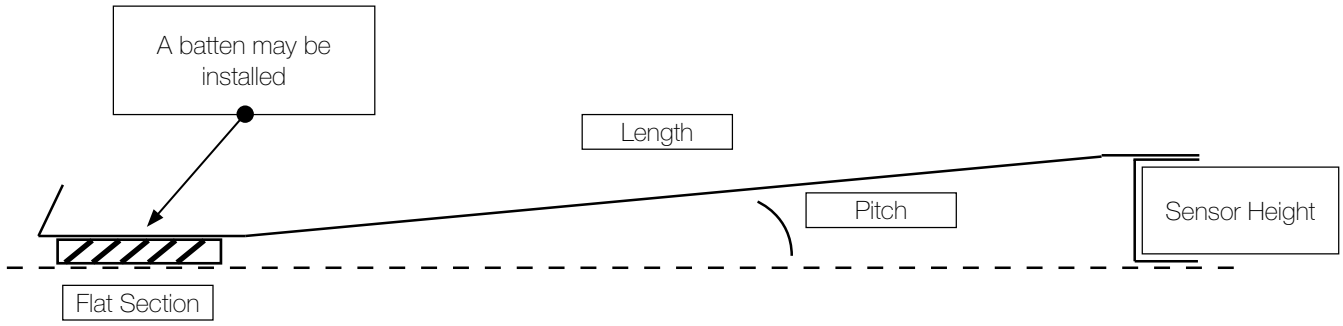
Installation Steps 11.1

MINIMUM ROOF SLOPE FOR FLASHINGS INSTALLATION ACCORDING TO THE THICKNESS OF THE PV PANELS.

MINIMUM TOP FLASHING PITCH : 5°



	PANEL THICKNESS			
	35	40	46	50
MINIMUM ROOF SLOPE (°)	14	15	16	17
MINIMUM ROOF SLOPE (%)	31%	33%	37%	39%



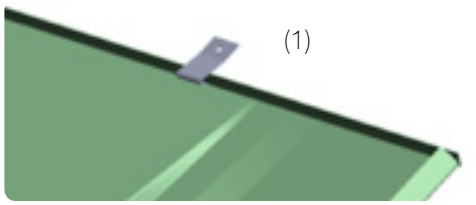
	H paneel			
	35	40	46	50
Batten X (mm)	8	13	19	25
Slope (°)	7	7	7	7
Slope security (°)	5			
Slope (°)	12	12	12	12
Slope (%)	22%	22%	22%	21%

A 5° margin is of course taken into account.
This information is only a guide.
Care should be taken to ensure that all roofing regulatory requirements are met.

Installation Steps 11.2

INSTALLATION OF TOP FLASHINGS

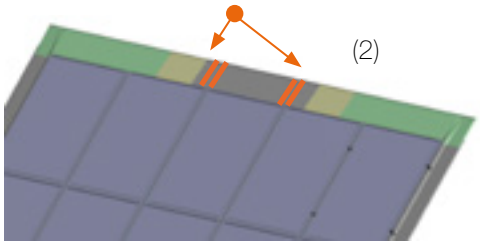
1/ Place the top center flashing, having made sure first that the top corner piece is fixed to the top center flashing (see p.28). To do so, clip the module in the space created by the top corner piece, and then fix the top center flashing piece to the roof structure using the flashing hooks.



Add 2 lines of PU adhesive between the junction and the top center flashing.

2/ Ensure that 2 top flashing pieces are connected together with the “Top Flashing Junction” piece.

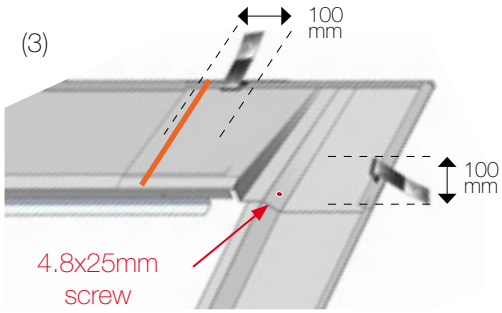
Apply two vertical beads of PU adhesive to ensure waterproofing.



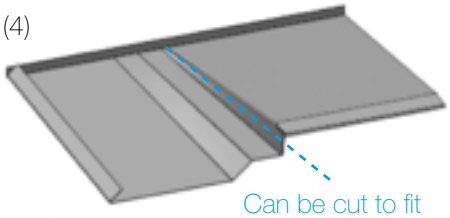
3/ Place the Top left and top right flashing pieces on top of the top center flashings and the lateral flashings.

Once the top corner flashings are positioned, use the 4.8x25mm screws supplied.

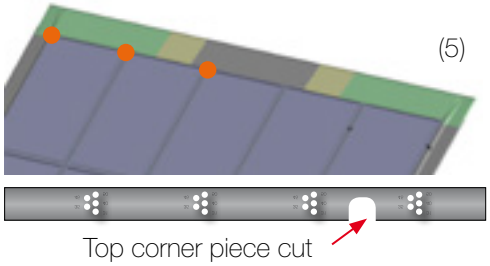
Apply two vertical beads of PU adhesive to ensure waterproofing.



4/ The top corner flashing can be adjusted to the panel thickness by cutting.



5/ In a portrait installation the top corner piece (for top flashings) needs to be cut at the edge of the mounting plate.



Installation Steps 11.3

REPLACING TOP FLASHINGS WITH A LEAD WATERPROOFING STRIP

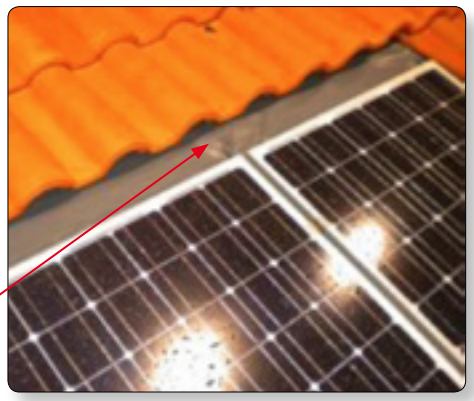
Lead waterproofing strip is warrantied for 30 years by its manufacturer. It applies like any waterproofing strip or any lead strip. It can be welded as well like traditional zinc.

1/ Unroll the lead waterproofing strip, ensuring that the top of the plate is covered and that the strip is under the tile by at least 15cm. It is hence necessary to adapt the width of the waterproofing strip to respect this rule.

2/ Fold back 2 cm of a the waterproofing strip at the top.

3/ 2. Unroll the precompressed seal on the entire width of the installation, **making sure it connects with the precompressed seal on the lateral flashings.**

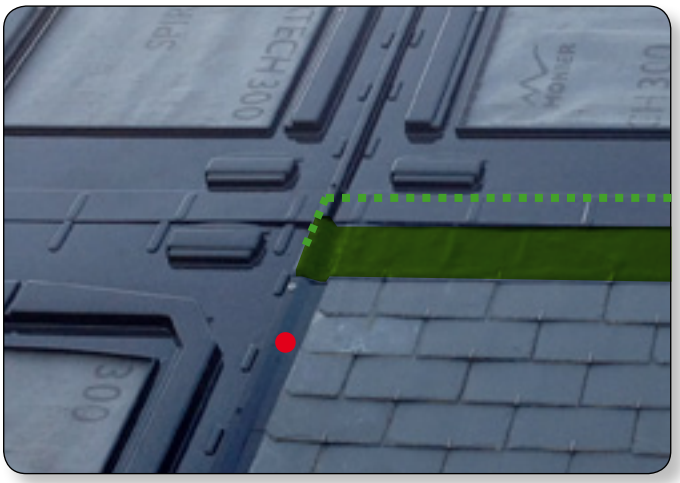
- On slopes that are less than 20 degrees, it is imperative to use a lead waterproofing strip at least 45cm wide.
- ATTENTION : For slate or flat tiles, put the slate or tiles over the waterproofing strip without covering the GSE plate wave. Otherwise some tiles would be lifted by the plate wave compared to the tiles next to them.



Installation Steps 12.0

INSIDE AND OUTSIDE ANGLE

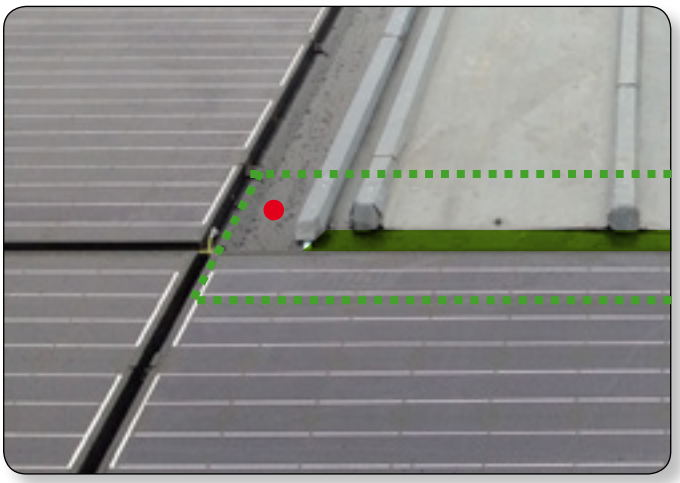
For specific configurations of inside and outside angles, a waterproofing strip is necessary. This installation process answers to roofing regulations. However a few rules need to be followed :



OUTSIDE ANGLES / "T" ANGLE

- Position the lateral flashing

--- Put the GSE plate over the waterproofing strip, making sure that the overlap is at least 12cm and that the strip goes over the all the way to the GSE plate edge wave

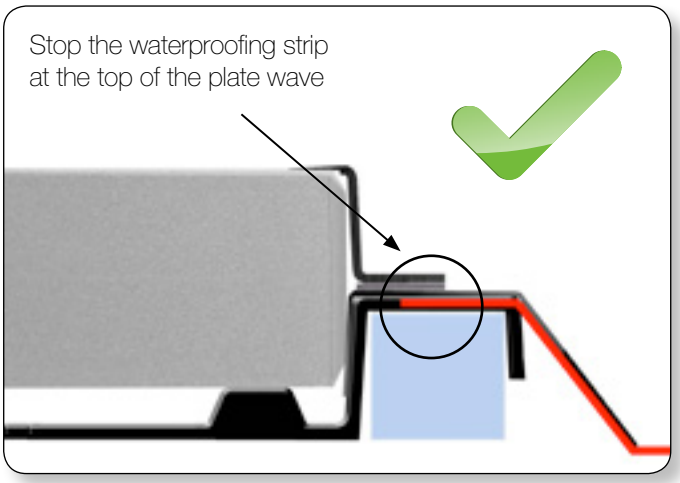


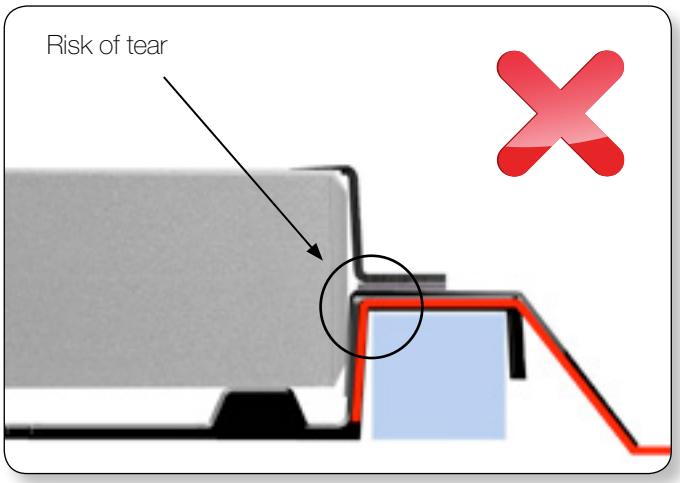
INSIDE ANGLE / "L" ANGLE

--- Position the waterproofing strip on the top of the plate, as well as over the plate wave that form the inside angle.

- Position the lateral flashing from the top of the waterproofing strip to the panels support of the GSE plate beneath

Make sure to cut the waterproofing strip at the top of the plate wave to avoid a tear over time.





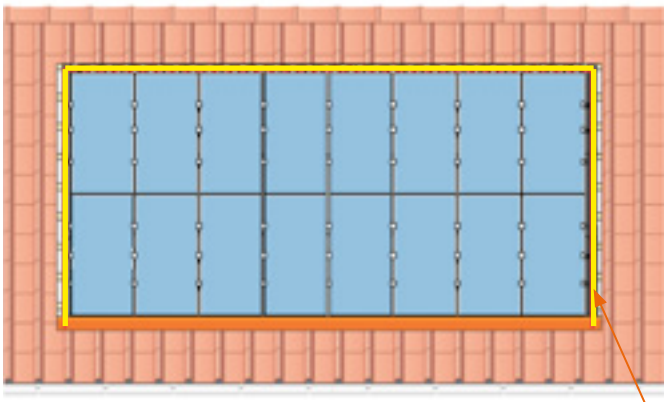
Installation Steps 13.0

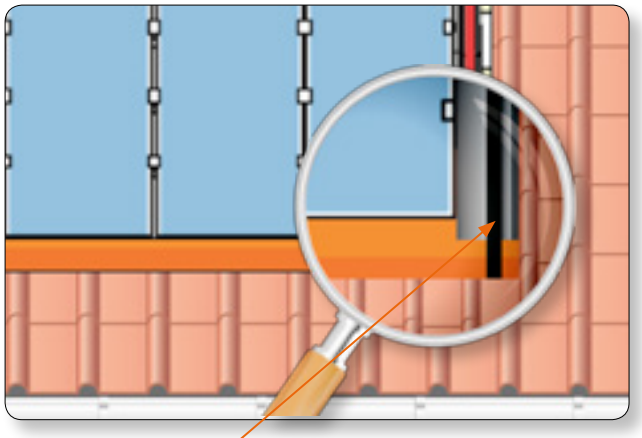
INSTALLING THE PRECOMPRESSED SEAL

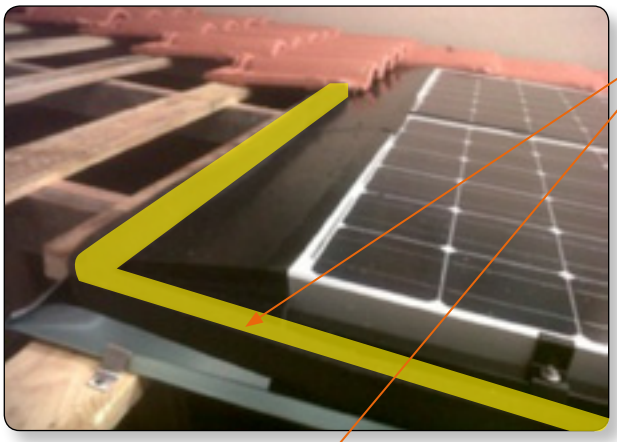
(recommended size: W 20 mm / H 40 mm)

1/ Unroll the precompressed seal on the lateral flashings all the way to the bottom of the waterproofing strip.

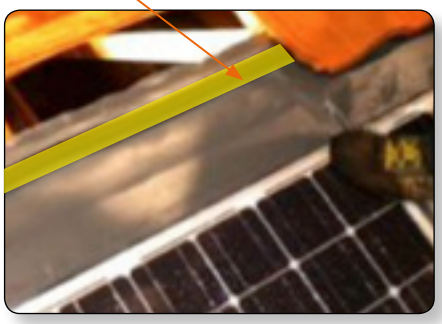
The junction between 2 joints needs to be tight.



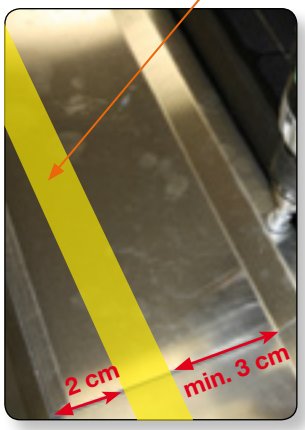




Precompressed seal



2/ Unroll the precompressed seal on the entire length of the top flashing.

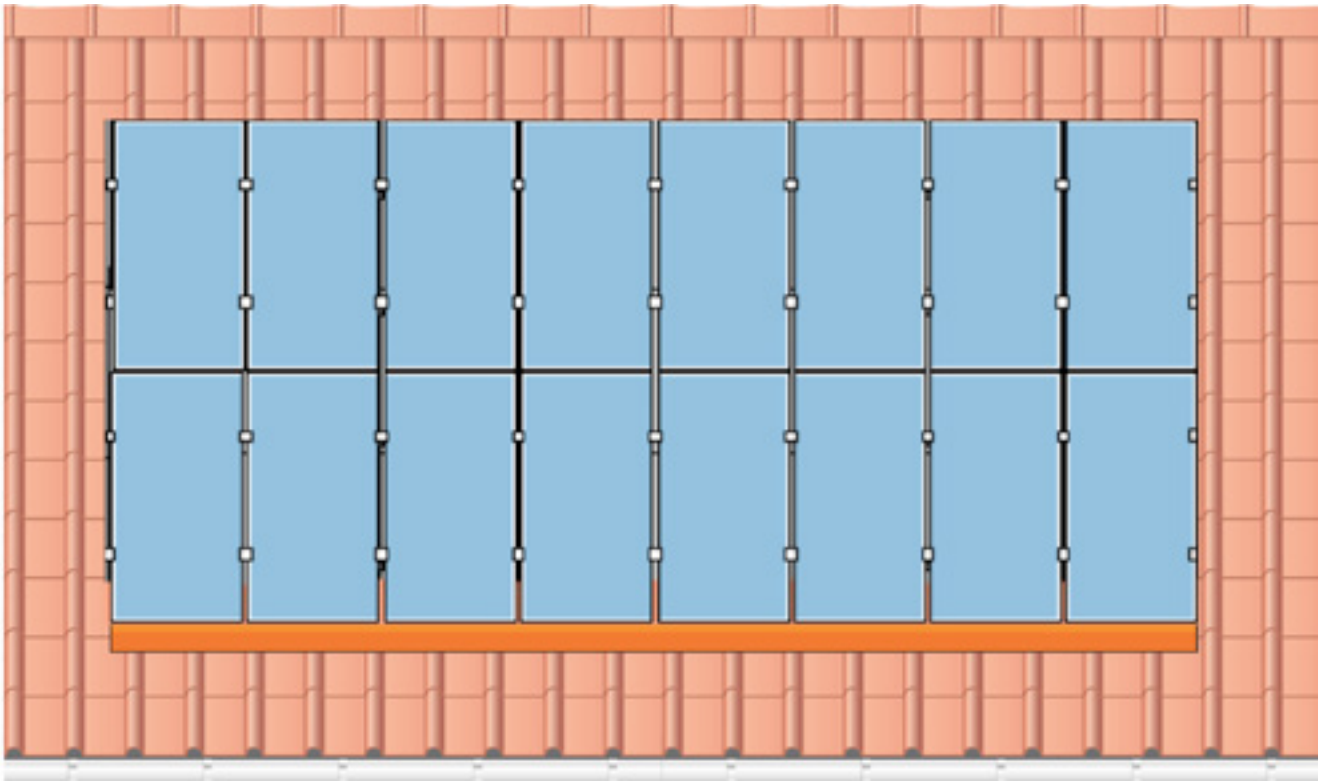


3/ The precompressed seal needs to be put at 2cm from the edge of the lateral flashings. You also need a minimum of 3cm from the edge of the mounting plate in order to have proper water drainage.

Installation Steps 13.1

PV FIELD INSTALLATION FINAL STEPS

Put back the rows of tiles or slate on top of the lateral flashings and on top of the top flashings, covering enough of the flashings.



Maintenance

INSPECTION

It is important to check once per year whether any leaves or other elements have penetrated under the photovoltaic system. Such elements can be blown out using a compressed air blower. Do not use solvent to clean the mounting plates, which are in polypropylene.

It is recommended that you offer your customers a maintenance contract, which would include an annual inspection of : generation, electrical system, panels, panel mounting plates, mountings, precompressed seals, waterproofing strip.

REPLACING A MODULE

1/ Power off the PV INSTALLATION.
2/ Remove the clamps from the panel to be replaced.
3/ Disconnect the earthing connection and disconnect it from the string.
4/ Take out the panel that needs to be changed and replace it with the new one.
5/ Connect the new panel to the earth and reconnect it to the string.
6/ put back the clamps.

The equipotential connection must be maintained.

Assistance & contact

TRAINING

Trainings can be organized with your distributor.
Please contact your distributor for further information.

TECHNICAL ASSISTANCE

TECHNICAL ASSISTANCE IS AVAILABLE WITH YOUR DISTRIBUTOR OR FROM MONDAY TO FRIDAY AT THE CONTACT INFORMATION BELOW.

GSE Intégration

16 QUAI GUSTAVE FLAUBERT 76380 CANTELEU
Tél. 02 32 10 77 60
Mail : **technique@gseintegration.com**

Our Certifications

- "PASS INNOVATION VERT" Nr. 2013-221 – Module ZN Shine (from oct. 2013 to oct. 2015)

THE FRENCH ETN CERTIFICATION AUTHORIZES THE INSTALLATION OF GSE INTEGRATION IN PORTRAIT AND LANSCAPE PROVIDED THAT THE MODULE MANUFACTURER ACCEPTS THE MODULE FIXATION ON THE SMALL SIDE.

- ETN INDICE 0 - BT130003
  Validated by Alpes-contrôles :

*Solarworld Sunmodule + (Mono) – portrait
*Soluxtec Powerslate (Mono) – portrait/landscape
*Sillia 60P (Poly) – portrait
*BenQ PM245 (Poly) – portrait
*QCells G3 pro (Poly) – portrait/landscape (1400 Pa)

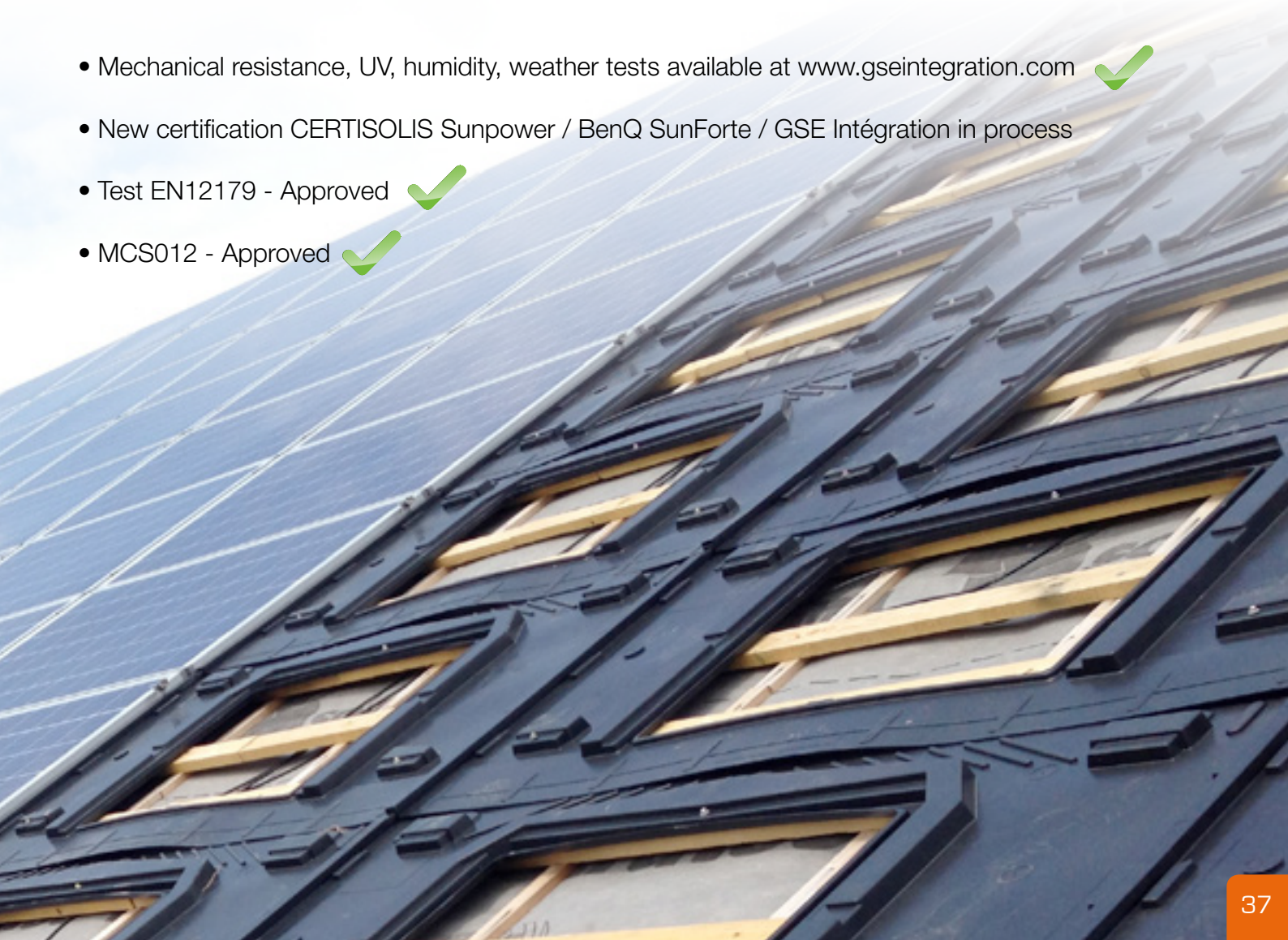
- ETN INDEX 1

*Solarworld Sunmodule Poly & SunProtect
*Sunpower 3XX (Mono)
*BenQ SunForte (Mono)
*Soluxtec Das module (Poly-Mono)
*Aléo S19 HE (Mono)
*Csun 60P / 60M (Poly-Mono)
*Solarwatt (Poly-Mono-Vision)
*LG (Poly, Mono, Mono X)

- FireTest :

*BROOF T1 – Approved (Belgian, Deutsch, and German markets)
*BROOF T3 – Approved (French market)
*BROOF T4 – Approved (British market)

- Mechanical resistance, UV, humidity, weather tests available at www.gseintegration.com
- New certification CERTISOLIS Sunpower / BenQ SunForte / GSE Intégration in process
- Test EN12179 - Approved
- MCS012 - Approved



Completed Installations Examples

Completed Installations Examples

GSE INTEGRATION is a GROUPE SOLUTION ENERGIE
patented development program
www.segroup.fr

GSE Intégration

Your distributor :

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